THE
Young Mans Companion:
Or, a very useful Manual for
YOUTH.

CONTAINING

Plain Directions whereby Youth may attain to Read and Write true *English*. Also Instructions for writing Short-hand, called Characters. The Foundation of Arithmetick in Whole Numbers, Vulgar Fractions and Decimals.

WITH

Very easie Rules for measuring of Land, Globes, Cones, Walls, Timber, Stone, Board, Glass, and the like, Arithmetically, and by *Gunters* Line. And also a very easie way of Dialling; and some uses of *Gunters* Quadrant. With Directions for Colouring Maps and Dials.

To which are Added,

Some Monthly Observations for the Lovers of Planting, Grafting and Gardening; with a Description of the Honey-Bee. Experiments in Physick and Chyrurgery. And also a short History of the Ancient Inhabitants of *England*, with a small Map thereof.

Together with many other useful things, to encourage Youth to Vertue.

With an Alphabetical Table for the ready finding of any matter herein contained.

Written in a plain stile, whereby an ordinary capacity may attain the same without a Tutor.

The Third Edition Corrected, with many New Additions. By *William Mather*.

London, Printed for *Tho. Howkins*, in *George-yard* in *Lombard-street*. 1692.

TO THE READER.

THe kind Acceptance which my two last Books have had with the World, has encouraged me to comply with the Importunity of the Bookseller, to compose this third, or rather new Edition, being almost all new, or different from the former Impression; partly composed of my own, and partly collected from others, comprized in as few words as I could, to avoid obscurity; designing it chiefly for those, who have neither Money enough to buy great Books, nor time to peruse, nor perhaps Learning enough to understand them; especially if the Authors labour (as commonly they do) to fill them with hard words derived from the Latin, Greek and other Languages, as tho they were rather ambitious to tell the World they are Learned, than desirous to unfold their Art:

Such as these perhaps will carp at the meanness of my Stile, but let such know it was never designed for them: But on the contrary, I have endeavoured to accommodate it to the meanest capacity, by avoiding hard Words, and explaining those Terms of Art, which Custom has made necessary to be used, and by delivering the Rules in the most plain and Intelligible Stile I could invent. My Aim herein hath been more for the publick good, than any private Gain, or publick Fame: For at the first, I never designed to appear so publickly in Print; and how I came to be engaged therein, is as followeth.

I teaching a private School; for the use of my Scholars only I composed a short Catechism, which they by transcribing often over committed many errors, to prevent which I sent it to a Bookseller to be printed, who desired me to make some useful Additions to it; as Instructions for Spelling and Reading, with Admonitions to encourage Youth to Virtue, which I did; but the Bookseller still delayed the finishing of it, expecting

ing more Additions from me, who continued ſending till the price of the Book amounted to 18d. *Now by ſending thus by pieces, 'twas impoſſible to diſpoſe things in their true Order.*

The ſecond Impreſſion likewiſe was not in my power to correct, for the Bookſeller was deſigned to reprint it without my conſent, of which when I was informed, I made more Additions, relating to ſuch Arts which I thought would be moſt ſerviceable to my Country, leaving it to the Bookſellers diſcretion, whether he would print it, or not, which made it liable to the ſame exceptions with the former Impreſſion.

But this my third and laſt Edition is very unlike the two former, for I have not only diſpoſed it in better order, but left out what I thought would be leaſt grateful to the Reader, and in the place thereof, I have added many other uſeful things; as in Arithmetick, which I have ſo far enlarged, that it hath very ſmall Affinity with that of the former Edition; this being ſo eaſy

that

that an ingenious Youth may attain the same without a Tutor.

The Reason why I have insisted so largely, on this first part of Arithmetick, is, not only for its general usefulness in all kind of Commerce between Man and Man, but also because it is the very Foundation of the Mathematical Sciences; for without a competent Knowledge therein, the following Rules for measuring Land and Timber, Gauging, with the use of Gunter's *Line and Dialling,* &c. *will be hard to learn, of all which, I have written much more largely, than in the former Edition.*

I have likewise added short and easy Rules, whereby one, of a mean Capacity, without a Tutor, may attain the Art of Short Writing, in a short time.

Many other useful Additions are inserted, which will be too much here to ennumerate, of which the Table at the end will best inform you.

To conclude, all the Recompence I aim at in this my Undertaking, is wholly and only, that my Countrymen

may

may be benefited thereby, and that Young men may by these harmless Studies (in this my Young-mans Companion) *be diverted from those vain Sports and Follies, which are too too often the Companions of that Age, which if it be, I have my Desire and Reward*

Who am,

A Well-wisher of

the General Good of All,

W. M.

The

Cielin-

Juic

Table

The CONTENTS *of the*

ADVERTISEMENT.

Boil a handful of Rosemary in half a pint of Sallet Oyl, being crisp, strain it, and add a quarter of a pint of Venice Turpentine, heat it a little, and stir it till it is almost cold; to make a rowl of plaistering of some of this Balsom, melt some of it with Bees-wax and Rozen: Or if you boyl the Herb Clownswort in hogs seeme till crisp, it will do your work, for Wounds, Burns, *&c.* * But if you cannot come at this readily, for a Burn or Scald, boyl white Lead, Oyl of Roses, and the Juice of Housleek to an Oyntment.

* *Clown-wort is like unto Speermint, it has a square, hollow and hairy stalk, grows near Ditches and Riversides, 3 or 4 foot high sometimes.*

Griping

Note, That if you make the Diet-drink in p. 114, particularly for the Kings-Evil, or Cancer, add to it, Juniper-berries ℥vj, Maiden Hair one handful, and Pilewort roots 4 handfuls, drink frequently thereof, except at Meals, and an hour before and after, doubt not of help with Gods blessing.

But to still add to a Cure, before every draught, take a pill of the Balsom of Tolu; you may buy that which is very good, for 1s. the Ounce, of *W. Pennington*, at the *Queens*-head in *Newgate*-street, *London*, Drugest.

The Virtues of this Balsom of *Tolu*, is mentioned by Dr. *Salmon* in *p.* 157. in his new *London* Dispensatory printed *Anno* 1685.

ERRATA.

E R R A T A.

In Page 44 in the first Table Characters, the figures 1. 2. 3. 4. are placed in the same by the Ingraver. Whereas in the Copy they were set in the Margent on the left hand according to the Explanation. Therefore I add as follows, under the figure 1, in the Table are the 24 Letters, and Characters for them; the six Lines under the figure 2, are the double Contonants. Lastly, Set the figure 3 in the Margent of the Table against the Capital B and proceed as in the Explanation. Or according to the Ingenious *W. Mason*, in his *Arts Advancement* ———— Thus

Four Vowels a *and* e *at head are put,*
I *in the middle,* o *and* u *at foot* (thus l:)
But if you think such Vowels doubful yet,
Unless their Places *more distinct be set.*
Then this observe, place a *and* o *close by* (thus l:)
But e *and* u *need not be set so nigh.*

For 20, write the figure 2 and a dot, thus 2˙ For 200, write two dots, as 2˙˙ For 1000 write 1˙˙˙ and the like.

Page 67 add, The Seeds of Flower now sown may bear Flowers the following year. *Line* 10 *add* Cow dung and good Earth of each a like quantity having laid together all Summer, and often turned and mixt together, of which make your Garden for Flowers: *P. 67 l.* the last, *add,* unbind the ainnoculated Buds, if taken, and prune the Stocks a little; *p. 77. l.* 25, at Stocks, *add,* of 2 or 3 years old; *p. 68. l.* 27. at the word Close, *add,* except the downright roots of Peaches and Nectorines. *p.* 74 *l.* 9. *add,* kill the Earwigs in the Hoofs about mid day. *p.* 71 *l.* 20 after asunder, *add,* make little paths 2 yards distance. *p.* 60 *l.* 6 after

Plant

ERRATA.

Plant, *add*, after a Shower of Rain, hough the Earth round each Plant, like unto a Mole-hill, pretty high, which often prevents their running to Seed. *p*, 72 *l.* 27. *read*, Rotten Sow dust of wood, *p.* 60 *l.* 20, at Gravel, *add*, or Saw-dust of Wood is good for Garden paths. *p.* 56 *l.* 16 *for* bred *r.* bud. *p.* 57 *l.* 3 *for* chilled *r.* chitted, and *l.* 22. for the figure 2 *r.* 20. *p.* 61 *l.* 7 *for* Herds *r.* Herbs, and *l.* 24 *for* chores *r.* cords. *p.* 63 *l.* 4. after Box, *add*, Clove-gilli-flowers. *p*, 80 *l.* 7 aftea Bed *r.* and sweet. *p*: 100 *l.* 31 *for* Oil *r.* Dil. *p.* 92 *l.* 9 *for* searchers *r.* searecloths. *p.* 173 *l.* 15. *for* days *r.* weeks. *p.* 85 *l.* 3 *for* Groundjoy *r.* Ground Ivy. *p.* 77 *l.* 4 *add*, let your Bee hives be on the stools, without any prop to reer them from the stool, so may you with a little wet ashes close them up in Winter, and you may easily dress them often from Maggots, that are too apt to breed under the edges of the Hives, too much neglected to the destruction of many Bees, cutting a place on the edge of the Hive for their passage in and out; some Hives are so made by the men that makes them. p. 204. l. the last save one, read the $\frac{32}{20}$ parts of, *&c.*

The

The Young Man's Companion.

The ſeveral ſorts of Letters uſed in Reading.

a	*a*	a	A	*A*	A
b	*b*	b	B	*B*	B
c	*c*	c	C	*C*	C
d	*d*	d	D	*D*	D
e	*e*	e	E	*E*	E
f	*f*	f	F	*F*	F
g	*g*	g	G	*G*	G
h	*h*	h	H	*H*	H
j	*j*	j	J	*J*	J
i	*i*	i	I	*I*	K
k	*k*	k	K	*K*	L
l	*l*	l	L	*L*	M
m	*m*	m	M	*M*	N
n	*n*	n	N	*N*	O
o	*o*	o	O	*O*	P
p	*p*	p	P	*P*	Q
q	*q*	q	Q	*Q*	R
r	*r*	r	R	*R*	S
ſ s	*ſ s*	ſ s	S	*S*	T
t	*t*	t	T	*T*	U
u	*u*	u	U	*U*	V
v	*v*	v	V	*V*	W
w	*w*	w	W	*W*	X
x	*x*	x	X	*X*	Y
y	*y*	y	Y	*Y*	Z
z	*z*	z	Z	*Z*	

Directions

Directions to Read and Spell truly.

THE Vowels, are the Letters, a, e, i, o, u, the other Letters are called Consonants.

A Dipthong is the sounding of two or more Vowels together, without a Consonant between them, they are commonly used in words of one Syllable.

There are Nine Dipthongs, as,

1 ai, or ay, as in Maid, May.
2 au, or aw, as Laud, Law.
3 ea, as Earth.
4 ee, as Seed.
5 ei, as Heir.
6 eu, or ew, as feud, few.
7 oi, or oy, as coy, boy, joy.
8 oo, as good.
9 ou, or ow, as loud, low.

A Consonant is a Letter that maketh a sound with a Vowel.

A Syllable is a perfect sound, made sometimes of Vowels only, and sometimes of Vowels and Consonants; no Syllable hath above eight Letters in it, as *Strength*.

Neither hath any word above seven Syllables, in the *English* Tongue, as, *Re-con-ci-li-a-ti-on.*

Observe how many Vowels there are in a word, so many Syllables it hath in it, as in *Re-con-ci-li-a-ti-on*, except the word end in e, or es, as in *have*, and *James*; or if there be a Diphthong in it, as in *may* or *your*; after *q*, is always *u*, with another Vowel, as in *quick*; and a Vowel commonly follows this *v* Consonant.

☞ *Note*,

☞ *Note*, That the Diligent Scholar, (who did not learn to read well in his Infancy) should get one Friend or other, to pronounce some words for him, because the greatest Difficulty is in giving the right pronunciation to words, which ought to be observed by every School-Dame; (that is) That they pronounce a hard word often to the Children; and also to those who are past their Infancy; it much forwards their learning to read, if sometime of the day they learn to Write a plain Hand resembling the Print, and made to spell their Copies without Book.

Directions for true Spelling and Writing English *Words, which are alike in sound, yet unlike in their Signification.*

A.

Accidence, for Scholars
Accidents, Chances
Adapt, to fit any thing
Adopt a Son
Advice, Counsel
Advise, to counsel
Ale, Drink
Ail, trouble
All, every one
Awl, for Shoemakers
Allay, asswage
Alloy, or Metal
Allie of State
Altar for Sacrifice
Alter, to charge
Aloud, with raised voice
Allow'd, approved
Ant, Pismire
Aunt and Unkle
Air, Element
Are, they are
Heir to an Estate
Arrant, notorious
Errant, in charge
Array, to cloth
Array, order of Battle
Ascent of an Hill
Assent, consent
Augar, to bore with
Augur, a Soothsayer
Ax, to cut wood
Acts, Laws.

B.

Bacon, Hogs-flesh
Beacon, to be set on fire
Ball, to play with
Bawl, to cry
Barbary, a Kingdom
Barberry, the Fruit
Bare, naked
Bear, the Beast
Beer, to drink
Bier, for a Corps
Barly, the Grain
Barrow, for a Labourer
Borrow, not to lend
Burrow, for Rabbets
Bean, Corn
Been, I have been
Belly of Man
Bely, to speak Lies
Berry, that grows
Bury, to lay in Grave
Bile, on the Body
Boil, to seeth
Blue, colour
Blew, did blow
Boar, the Swine
Bore, to make a hole
Bough, a Branch
Bow, to bend
Bow, to shoot with
Bruit, report
Brute Beast
Buy, to Purchase
By and By.

C.

Carnal, fleshly
Kernel of a Nut
Causes, Matters
Cawseys, Wayes
Carreer, full speed
Carrier of Letters
Cellar, place underground
Seller of Goods
Censer, for Incense
Censure, to judge rashly
Centaury, an Herb
Century, a 100 Years
Chair, to sit in
Chare, work
Choler, Anger
Collar, Neck-band
Clause of a Sentence
Claws of a Bird
Common, Publick
Commune, to talk together
Councel, that giveth Counsel
Council, the Assembly
Course, a Race
Corse, a Dead Body
Coarse, mean.

D.

Dame, for Children to Learn with
Damm, to stop up
Damn, to Condemn
Dear Friend
Deer, the Beast

Debter,

Debter, that oweth
Deterr, to frighten
Decent, seemly
Descent of a place
Desart, a wide place
Desert, Merit
Device, Stratagem
Devise, to invent
Disease of the Body
Decease, Death
Divers in the water
Diverse, different
Do, to act
Doe, a Female Deer
Dollar, *Dutch* Coyn
Dolour, Grief
Done, made
Dun, colour
Due, owing
Dew, on the Grass

E.

E*Ast* Wind
Yeast for bread
Emeraulds, Stones
Hemeroids, a Disease
Employ, make use
Imply, to entangle
Endite a Letter
Indict, to Accuse
Exercise, Labour
Exorcise, to Conjure
Eye of the Body
I, my self
Eyes in the Head
Ice, water frozen.

F.

F*Allow* ground
Follow, pursue
Fain, willingly
Feign, to invent
Fair, Beautiful
Fare, Diet
Faun, young Deer
Fawn, to flatter
Fiend, Evil Spirit
Find, to discover
Fin'd, amerced
Fir, Tree
Fire, to burn
Far, distant
Fur, a hairy Skin
Flay off the Skin
Flea, the Vermin
Flee, to escape
Flie, the Insect
Fly with Wings
Floor of a Room
Flour of Meal
Flower of the Field
Foul filthy
Fowl that flies
Franck, *Francis*
Frank, free
Freeze, by Frost
Friez, Cloth.

G.

Garden, for Flowers
Guardian, overseer
Gentile, Heathen
Gentle, meek
Gesture, behaviour
Jester, one given to Scoffing
Guest, Sojourner
Ghess, to conjecture
Gilt, with Gold
Guilt, fault
Groan, for sorrow
Grown, in years
Groat, four pence
Grot, or cave.

H.

Hail, and Rain
Hale, to pull or dragg
Halloe, to cry out aloud
Hallow, to sanctifie
Hollow, empty
Hare, a swift beast
Hair, of the head
Heir, to an Estate
Heal, to cure
Heel, of the foot
Here, in this place
Hear, to hearken
Heard, with the Ear
Herd, of Cattel
Heart, in the body
Hart, Deer or Buck
Hence, above
Haven, for Ships
Higher, above
Hire, wages
Hoar, frost
Whore, Harlot
Hole, bored
Whole, Entire
Holy, Sacred
Wholly, altogether
Home, at my house
Whom, which man
Hoop, of a barrel
Whoop, to Hallow
Hour, of the day
Our, of us
Hue, colour
Hew, to cut
Him, that man
Hymn, a Divine Song

I.

I, My self, Ay, yes
Idle, slothfull
Idol, a false god
Imploy, on work
Imply, intimate
In, within
Inn, for Travellers
Incite, to stir up
Insight, a discerning
Ingenious, Witty
Ingenuous, candid
Joust, for sport
Just, upright
Isle, an Island
I'le, I will
Oyl, of Olives.

K.

Kell, of a Beast
Kiln, for Bricks
Knave, a Slie Fellow
Nave, of a wheel.

L.

Laten, for Tin-men
Latine, tongue
Leopard, the beast
Leaper, he that jumps
Leper, he that hath the Leprosie.
Least, smallest
Lest, for fear that
Leaven, for bread
Leaving, forsaking
Led, conducted
Lead, the mineral
Lessen, to make less
Lesson, to learn
Lettuce, the herb
Lattice, a Window
Lettice, a Womans Name
Line, of Writing
Loyn, of Beef
Lo! behold
Low, of Stature
Lome, of a Wall
Loom, of a Weaver
Lose, to forgoe
Loose, to untye.

M.

Made, done
Maid, a Virgin
Mail, coat for Armour
Male, Masculine
Main, Ocean
Mane, of a Horse
Manner, custom
Manour Lordship
Meet, convenient
Meat, for food
Mete, to measure
Message, Errant
Messuage, or tenement
Might, power
Mite, an Insect in Cheese
Million, in numbers
Melon, the fruit
Moat, round the house
Mote, in the Eye
Monument, Memorial
Muniment, Fortification
Mown, cut down
Moan, to bewail
More, in number
Moor, a black man
Morning, before noon
Mourning, Lamentation
Mews, as a Cat
Muse, to Meditate

N.

Naval, of a Navy
Navel, of a man
Naught, bad
Nought, nothing

Nay, No,
Neigh, as a horse
Neat, handsome
Net, for birds
Need, want
Knead, dough
Nephew, Kins-man
Navew, herb
Navy, Fleet of Ships.

O (oh.)

OWe, to be indebted
Oar, of a Boat
Ore, of Gold
O're, over
Oat, for Oatmeal
Ought, for any thing
One, the first of Numbers
Own, to acknowledge
Order, method
Ordure, Excrement.

P.

PAil, water vessel
Pale, in colour
Pallat, of the mouth
Pallet, bed
Parasite, a Flatterer
Parricide, that kills his Father
Pare, the Nails
Pair, a couple
Pear, the fruit
Pastor, of a congregation
Pasture, for sheep
Peer, of the Realm
Pier, a Haven
Pence, pieces of mony
Pens, to write with
Person, of a man
Parson, of a Parish
Pillar, of stone
Piller, of bark
Pole, or Pole-Star
Poll, the head
Poor, people
Pore, of the body
Pour, to empty
Power, strength
Practice, the exercise
Practise, to Exercise
Pray, to beseech
Prey, booty
Precedent, foregoing
President, Example
Presence, appearance
Presents, or gifts
Princes, Rulers of Countries
Princess, the Daughter of a King
Principal, chief
Principle, ground of belief
Prophet, foreteller
Profit, gain
Pronounce, to utter words
Pronouns, parts of Speech

Q.

QUarry, of Stone
Query, doubt
Querry, for the Kings horse
Queen, Kings Wife
Quean, a Strumpet.

R

Rack, to torment
Wrack, or Ship-wrack
Rain, water
Reign, as a King
Raise, to lift up
Rays, of the Sun
Rase, to demolish
Race, Run
Reach, out thy hand
Retch, to Stretch
Wretch, one miserable
Read, in a book
Reed, grows in the water
Red, of Colour
Rear, to raise up
Rere, of an Army
Reign, of a King
Reins, of the back
Rise, out of bed
Rice, the grain
Rigger of a Ship
Rigour, severity
Right, just due
Rite, Ceremony
Rode, I did ride
Rod, or Pole
Road, highway
Roe, of a Fish
Row, of Trees
Room, in an house
Rome, the City
Rough, hairy
Rote, got by heart
Wrote, I did write
Wrought, did work
Rowle, as a Stone
Roll, of the Court
Rubbed, chafed
Rubid, Ruddy.

S

Sail, of a Ship
Sale, of goods
Saviour, who saves
Savour, smell, or taste
Scent, smell
Sent, as a Messenger
Science, knowledge
Sions, of Trees, Grafts
Seizin, Possession
Season, of the year
Sever, to part
Severe, austere
Share, a part
Shear, the sheep
Sheep, of the Flock
Ship, one the Sea
Shoot, a dart
Shout, to make a noise
Sise, of fit length
Size, for Painters
Sight, the sense
Cite, to Summon
Site, Situation
Sink, down
Cinque-port
Sleight, of hand
Slight, to despise
Sloe, the fruit
Slow, pace
Sew, with a needle
Sow, seed
Soar, fly up

Sore, finger
Swore, he did swear
Sole, Fish
Soul, in the body
Some, of any thing
Sum, of mony
Son, of the Father
Sun, in the skie
Soon, quickly
Swoon, fainting
Sound, a noise
Stare, to look on
Starr, in the skie
Stair, to step up
Steal, to rob
Steel, the mettal
Succour, help
Sucker, of trees
Suit, of Apparel
Sute, request

T.

Tale, that is told
Tail of a beast
Tares, in grain
Tears, in the eyes
Team, of Horses
Teem, with child
Term, for Law
Then, at that time
Than, used in comparison
There, in that place
Their, belonging to them
Through, by means of
Throw, to cast
Tiles, of houses
Toyls, Nets
Toyl, labour
Time, of the day
Thyme, the herb
Title, of honour
Tittle, a small speck
Two, in Number
Too, also
Toe, of the foot
Tow, that is spun
Towe, the boat along
Tongs, for the fire
Tongues, Languages
Tost, in a boat
Toast, in Ale.

V.

Vain, foolish
Vein of the body
Vale, valley
Vail, covering
Valley, between two hills
Value, worth
Volley of shot
Viol, or Musical Instrument
Vial, a glass
Unit, one
Unite, to agree
Ure, practice
Your, or your house
Use, to enjoy
Ewes, or sheep
Utter, to give forth
Otter, devours fish.

W

Wales, the Country
Wails, bemoans
Ware, Merchandise
Wear, on ones back
Were they there?
Wast? was thou? or thou wast
Waste, to spend
Waist, the middle of the body
Wait, to attend or serve
Weight, burthen
Way, passage
Weigh, with Scales
Weary, of walking
Wary, cautious
Weather, fair or foul
Wether, mutton
Wean, from the breast
Wen, a swelling
Weal, Publick weal
Wheal, a pimple
Wheel, of a Cart
Whether, or no
Whither, to what place
Wrath, anger
Wroth, angry
Wrest, to wring aside
Rest, to take rest
Wright, a workman
Write, with a pen
Right, not wrong
Wrong, not right
Rung, or ring a bell
Wry, not streight
Rye, good grain.

Y

Year, 12 Months
Ear, to hear
You, or ye
Ewe, Sheep
Yew, tree
Younger, in years
Younker, or Stripling
Ye, your selves
Yea, or yes.

☞ The often Writing over these Words is the way to attain to Write true *English*; and so by use, which is the Mother of Learning or Language, one may come to be perfect enough, in Spelling all *English* words, of most use.

The

The Names of Men, in an Alphabetical Order.

A

ADam
Abel
Abraham
Anthony
Alexander
Auguſtine
Andrew
Ambroſe
Arthur

B.

BEnjamin
Bartholomew
Barnabas
Bernard
Bryan.

C.

COnſtantine
Chriſtopher
Charles
Cornelius
Clement

D.

DAniel
David
Duke
Denis

E.

EDward
Edmond
Edwin
Ellis.

F.

FRancis
Frederick
Ferdinando.

G.

GEorge
Gregory
Gabriel
Gamaliel
Gervaſe
Geoffery
Gilbert
Gerard
Godfrey
Guy.

H.

HEnry
Humphry
Hugh.

I.

I.

John
James
Joseph
Joshua
Jacob
Jeremiah
Job
Isaac
Jonathan
Jason
Jasper
Jonah
Israel
Justinian.

K.

Kenelm.

L.

Leonard
Laurence
Lewis
Lionel
Lancelot
Lodowick
Luke.

M.

Matthew
Mark
Michael
Marmaduke
Martin
Miles
Morgan
Moses

N.

Nicholas
Nathaniel
Nathan.

O.

Oliver.

P.

Philip
Paul
Peter
Philemon.

R.

Robert
Richard
Roger
Ralph
Randolph
Rowland.

S.

Samuel
Simeon
Solomon
Sampson
Stephen.

T.

THomas
Timothy
Titus
Tobiah.

V.

VAlentine
Vincent.

W.

WIlliam
Walter
Walwin.

Z.

ZAchary.

Womens Names in an Alphabetical Order.

A.

ANne
Abigail
Agnes
Alice
Amey
Arabella
Avice.

B.

BArbara
Beatrice
Bridget.

C.

CAtharine
Clara
Cassandra
Cicely
Charity
Christiana
Constance.

D.

DOrothy
Deborah
Dinah
Dorcas.

E.

ELizabeth
Eleanor
Eve
Esther

F.

FRances
Fabia
Faith.

G.

G.

GOoditha.

H.

HAnnah
Helena.

I.

JAne
Joan
Judith
Joyce
Isabel
Julia.

L.

LEah
Letice
Lydia
Luce.

M.

MAry
Martha
Margery
Margaret
Maudlin
Milicent.

P.

PRiscilla
Prudence.

R.

RAchel
Rebecca
Rosamund.

S.

SArah
Susanna
Sophia.

T.

TAbitha
Temperance
Thomasine.

U.

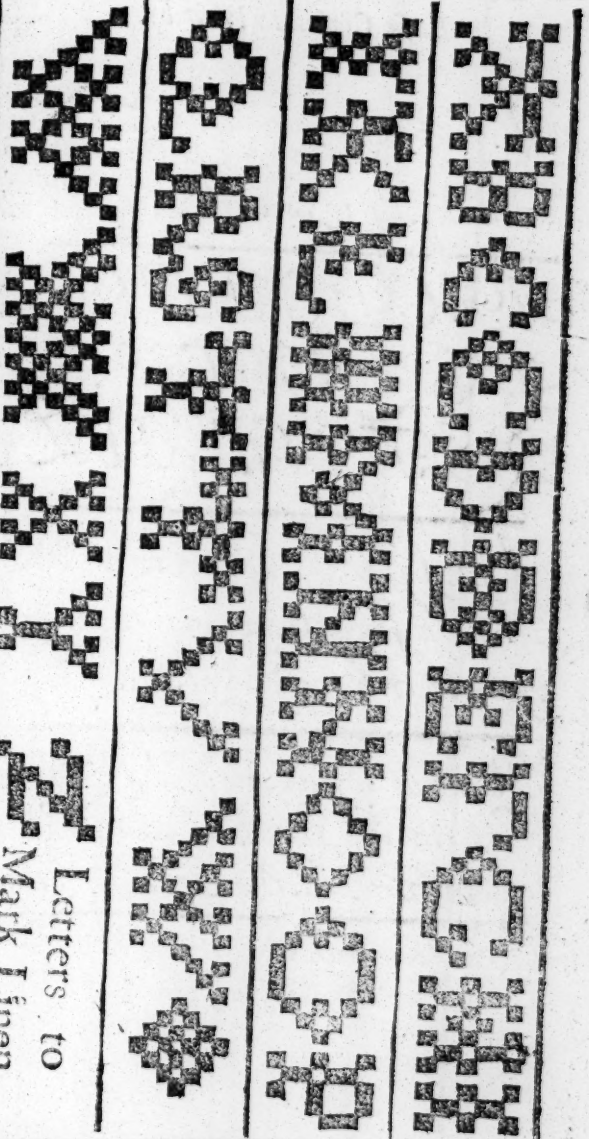
URsula.

☞ *Note*, That the *English* Names of Baptism (so called) are generally either *Saxon*, as *Robert*, *Richard*, *Henry*, *William*, *Edward*, *Edmund*, *Edwin*, *Gilbert*, *Walter*, *Leonard*, &c. which are all very Significative: or else out of the Old and New Testament,

ſtament, as *John*, *Thomas*, *Abraham*, *Iſaac*, *Jacob* &c. The Common People for Sur-names, added their Fathers Names with *Son* at the end thereof, as *Thomas Johnſon*, *Robert Richardſon*.

They also oft took their Fathers Nick-name, or Abbreviation, with addition of *S*, as *Gibs*, the Nick-name, or Abbreviation of *Gilbert*, *Hobs* of *Robert*, *Nicks* of *Nicholas*, *Bates* of *Bartholomew*, *Sams* of *Samuel*; and thence alſo *Gibſon*, *Hobſon*, *Nickſon*, *Samſon*, &c. Many alſo were Sur-named from their Trade, as, *Smith*, *Joyner*, *Weaver*, &c. or from their Office, as *Porter*, *Steward*, *Shepherd*, *Carter*, &c. Or from their places of Abode, as *Attwood*, *Attwell*, *Athill*, &c. which ſince are ſhrunk into *Wood*, *Wells*, *Hill*, &c.

Marks



Letters to Mark Linen.

Easie Copies to Writ by.

Aabcddeefghik
lmnopqrstvuwxyze

ABCDEFGH
IKLMNOPQ
RSTVWXYZ

Apply thy Heart to wisdom
and Instruction, and thine
eyes to the words of Knowledge

He that Spareth his Rod,
hateth his Son but he that
loveth him chastneth him betim

Chasten thy Son while there
is Hope & Spare not for his Crying

☞ By this Printed Copy you may learn to write by often traceing the Strokes thereof with a dry Pen, getting some Friend or other, to tell you the Letters; and where to begin each Letter: After which, write on Lines made on Paper (with a Ruler, and a piece of Lead) with Pen and Ink, till you are perfect.

To make good Black Ink.

PUT five Pints of Rain-water into a Pot; to which put three Ounces of Gum-Arabeck beaten, stir it with a stick once a day, or twice; when the Gum is dissolved, put to the Water six Ounces of beaten Gauls, one Ounce of green Copperace, and a quarter of an Ounce of Allum, stir it once a day as long as the Ink lasts, keeping it from the Frost, for that spoils it.

To make RedInk.

TAke small Brazil one Ounce, white Lead and Allum of each two Drachms, Gum-Arabeck eight Scruples, Urine one Pint, shake them often together.

Also Gum-Arabeck water mixed with Vermilion will serve.

An Alphabet of Copies for Children to VVrite.

ALL you that in fair Writing would excel,
How much you write regard not, but how well.

Be good to all Men, to the best be best,
Court Peace, with no Contentious Men contest.

Courteous Behaviour, and Expressions prudent,
Speak a Young Man, in Virtues School a Student.

Did we but know our nearness to the Grave,
What Thoughts! What Cogitations shou'd we have!

Easie it is to Write, but to Write well
Is very hard; much harder to excel.

For Virtues sake, now in your youthful prime
Be a good Husband of your precious Time.

God's a true Spirit; Truth's pure Fountain; he
In Spirit, and in Truth will worship'd be.

He that the most his own Will can deny,
With God's most holy Will may most comply.

If you esteem a Noble Reputation,
With Sons of Virtue have your Conversation.

Knowledge that puffs up the Possessours mind,
Is evermore of a pernicious kind.

Learn so to Live, as not to fear to Die;
That you may die to live Eternally,

Men fain would be thought Virtuous, tho' they
Still steer their Course the quite contrary way.

Nor fume, nor fret, nor stamp at things amiss,
That's not the way to mend them; Patience is.

One small Dram of good Life, exce's a Pound
Of Humane Learning, though the most profound.

Perform thy Promise; keep within Faiths Bounds,
Who breaks his Word, his Reputation wounds.

Quietness and serene Contentment are
The best Companions in this Mundane Sphear.

Refuse to act to Day, what may to Morrow,
Procure your Torment, or at least your Sorrow.

Such as delight in others Debts to run,
Have pleas'd themselves till they have been undone.

This is an Observation true, tho plain;
Those who most feed the Belly, starve the Brain.

Into your Sense this Sentence still apply,
That there's no Poyson like bad Company.

What things by Studious care a Boy does find
In Curious Arts, lodge longest in the mind.

Examine thy Heart by God's Word and Grace,
And let no sinful Thought, there find a place.

Young Men, have evermore a special care,
That Feminine Inchantments prove no Snare.

Zealously run for Virtues Crown of Bays,
Which having gain'd, present to Heaven the praise.

Of

Of the right placing of Points in VVriting.

Comma	,	*Interrogation*	?
Semicolon	;	*Admiration*	!
Colon	:	*An Hyphen*	-
Period	.	*Parenthesis*	( )

A Comma is the most frequent Point, and of least force; it is to be set when the least stop of the Voice is; as, *But when the Husbandmen saw the Son, they said among themselves, this is the Heir come let us kill him*, &c.

When there is a stop somewhat bigger, set (;) or (:) as *They that would destroy me, being mine Enemies wrongfully, are mighty: Then I restored*, &c.

When the sense and sentence is perfected and full then write (.) as, *Pray without ceasing. In every thing give thanks. Quench not the Spirit.*

After a Question asked, set this (?) as, *Whose Ass have I taken? Whom have I defrauded?*

After a wondering, admiring, or crying out, set this point (!) as, *O Wretched Man that I am! Death where is thy Sting!*

When you must divide a Word at the end of a Line, and with a part of it begin the next Line; then at the end of the Line where the first part is, you are to set down this Point (-) or when (by way of Elegancy) two or more Words are put in one, as *Self-love.*

A Parenthesis is () when some words may be left out, and yet the Sentence perfect, as, *I know that in me* (that is in my flesh) *dwelleth no good thing.*

(*) An Asterisk, or Asterism, shews that something more might be, or is said in another place, or to be observed*.

(") This shews something added to a former Edition; or the Citation of an Author.

☞ The Index points to something worthy to be observed.

(^) This mark shews something that is left out, and set down in another place, ought to be brought in.

The Apostrophe, being a small point put to the top of a Letter thus ('*d*) is used for the cutting off a Vowel, or Article, whereby two Words or Syllables are sounded like one; as, *'tis* for *it is*, *'twere* for *it were*, *he'll* for *he will*, *'twill* for *it will*, *Commenc'd* for *Commenced*, &c.

Capital or great Letters are set, First, after a full Stop; Secondly at the beginning of Verses, or lesser Sections; Thirdly, Proper Names of Men, and the like; Fourthly, words of great note, are sometimes written in Capital Letters; Fifthly, some are put for Figures of number; as, I, 1, V, 5, X, 10, L, 50, C, 100, M, 1000.

The Figures and Letters, whereby Numbers are Expressed, are these following.

1	One	I	15	Fifteen	XV
2	Two	II	16	Sixteen	XVI
3	Three	III	17	Seventeen	XVII
4	Four	IIII, or IV	18	Eighteen	XVIII
5	Five	V	19	Nineteen	XIX
6	Six	VI	20	Twenty	XX
7	Seven	VII	30	Thirty	XXX
8	Eight	VIII	40	Forty	XL
9	Nine	IX	50	Fifty	L
10	Ten	X	60	Sixty	LX
11	Eleven	XI	70	Seventy	LXX
12	Twelve	XII	80	Eighty	LXXX
13	Thirteen	XIII	90	Ninety	XC
14	Fourteen	XIV			

100	One Hundred	C
500	Five Hundred	D, or IↃ
1000	One Thousand	M, or CIↃ
5000	Five Thousand	IↃↃ
10000	Ten Thousand	CCIↃↃ
50000	Fifty Thousand	IↃↃↃ
100000	One Hundred Thousand	CCCIↃↃↃ
500000	Five Hundred Thousand	IↃↃↃↃ
1000000	Ten Hundred Thousand	CCCCIↃↃↃↃ

Of Scripture Names.

These being the most difficult of the Scripture-Proper Names, by getting them perfectly, the Learner may more easily read the Bible.

A.

A-bug-tha
A-bed ne-go
A-bi-a-thar
A-bi-jam
A-brech
A-chai-a
A-chesh
Ach-me-tha
Ach-sah
Ach-zib
A-do-ne-be-zek
A-do-ni-jah
A-ha-su-e-rus
A-ha-zi-ah
A-hi-jah
A-hi-ma-ar
A-hi-sa-maeh
A-chi-to-phel
Al-le-su-i-ah
Al-phe us
Am-mi-na-dab
A-na-me-lech
A-na-the-ma
Ma-ra-na-tha
An-ti-och
Ar-che-la-us
Ar-chip-pus
Arc-tu rus
A-re-o-pa-gus
A-ri-ma-the-a
An-ti-o-chus
Ar-ma-ged-don
Ar-phax-ad
Ar-tax-erx-es
Ash-ta-roth
As-nap-per
A-tha-li-ah.

B.

B.

BA-al-ha-li-sha
Ba-ra-chi-ah
Bar-ti-me-us
Bar-zil-lai
Ba-she-math
Bath-she-ba
Be-el-ze-bub
Be-er-she-ba
Bal-shaz-zar
Ben-am mi
Be-re-cha
Be-thes-da
Beth-le-he-mite
Beth-she-mesh
Bi-chzi
Bid-char
Bo-a-ner-ges
Bo-chim.

C.

CA-i-a-phas
Ca-per-na-um
Ca-si-phi-a
Cen-chre-a
Ce sa-re-a
Che-ma-rim
Che-mosh
Che-re-thi-tes
Chim-ham
Chit-tim
Chæ-nix
Cho-ra-zin
Chu-shan-ri-sha tha-im.

D.

DE-me-tri-us
Di-drach-ma
Di-o-tre-phes
Di-o-tre-phas
Di-o-ny-si-us.

E.

E-Bed-me-lech
El-be-thel
El-i-she-ba
Em-ma-us
Eph-pha-tha
E-sar-had-don
Eth-ba-al
Egle-lo-he-Is-ra-el
Eli-Eli-la-ma Sa-bach-tha-ni
E pa.phro-ditus
Eu-phra-tes
Eu-ro-cly den
Evil-me-ro-dach
Eu-ty-ches.

G.

GA-la-ti-a
Gar-ga-shite
Ger-ge-se-us
Ge-ra-zim
Ger-shom
Ge-shur
Gol-go-tha
Go-mor-rah.

H.

HA-da-de-zer
Ha-da-drim-mon.
Ha-ro-sheth
Heph-zi-ba
Her-mo-ge-nes
Hi-e-ra-po-lis
Hig-ga-i-on
Ho-ro-na-im
Hy-me-ne-us.

I.

JA-a-zo-ni-ah
Ja-besh Gi-le-ad
Ja-pheth
I-cha-bod
Je-di-di-ah.
Je-ho-a haz
Je-hoi-a-da
Je-ho-sha-phat
Je-ra-mu-el
Ish-bo-sheth
Is-ra-el-i-tish
Is-sa-char.

K.

KA-desh-bar-ne-a
Ki-kai-on
Kir-jath-je-a-rim.

L.

LA-chish
La-mech
La-o-di-ce-a
Lo-ru-ha-mah.

M.

MA-ce-do-ni-a
Mac-pe-la
Ma-ha-na-im
Me-her-sha-lal-has-baz
Ma-za-roth
Me-gid-do
Mel-chi-ze-deck
Me-ro-dach
Me-shech
Me-so-po-ta-mi-a
Me-ne Me-ne Te-kel
Up-har-sin
Mi-cha-i-ah
Mi-di-a-ni-tish
Mi-sha-el
Mna-son
Mo-lach
Mor-de-cai.

N.

NA-a-shon
Na-joth
Naph-tha-li
Na-za-rite
Ne-bu-chad-ne-zar
Ne-bu-za-ra-dan
Ne-hush-tan
Ne-tha-ne-el
Ne-tha-ni-ah
Ne-thi-nims
Ni-co-de-mus
Ni-cho-la-i-tans
Ni-sh-roch
No-a-di-ah.

O.

O.

O-Bed E-dom
Om-ri
O-ne-si-mus
O-ri-on
Oth-ni-el.

P.

PA-dan-a-ram
Pa-le-stin-na
Pam-phi-li-a
Pa-shur
Pe-la-ti-ah
Pen-te-cost
Per-ga-mos
Per-riz-zite
Pha-roah, Ho-phrah
Phi-la-del-phi-a
Phi-lis-ti-na
Ple-i-a-des
Po-ti-phar
Pris-cil-la
Pu-rim.

R.

RA-bo-ni
Rab-she-keh
Ra-cha
Ra-chel
Ra-moth Gi-le-ad.
Re-bec-ca
Re-chab
Re-ho-bo-am
Re-ho-both
Re-ma-li-ah
Rem-pham
Re-pha-im
Reu-ben
Rim-mon
Ru-ba-mah.

S.

SAn-bal-lat
Sa-phi-ra
Sa-rep-ta
Se-na-che-rib
Se-ra-jah
Se-ra-phims
Ser-gi-us Pau-lus
Sham-gar
She-ja-shub
She-chem
Shi-lo-a
Shi-me-i
Shim-shai
Shi-shak
Shu-la-mite
Shu-shan
Sib-bo-leth
Si-gi-o-noth
Si-lo-ah
Si-se-ra
Ste-pha-nus
Suc-coth-Be-noth
Sy-ro-phœ-ni-ci-an.

T.

TA-bi-tha
Ta-ha-pan-hes
Tah-pe-nes
Ta-li-tha-cu-mi
Ta-maz

Tar-ſhiſh
Te-ra-phim
Ter-tul-lus
Te-trarch
The-bez
The-o-phi-lus
The-ſo-lo-ni-ca
Thum-mim
Thy-a-ti-ra
Tim-nath-ſe-rah
Tir-ſha-tha
Ty-rus.

V.

VAſh-ti
U-phaz
Uz-ziah.

Z.

ZAc-che-us
Zal-mun-na
Za-re-phath
Ze-be-deck
Ze-cha-ri-ah
Ze-lo-phe-had
Zo-ro-ba-bel, *&c.*

Choice and Approved Preſidents, whereby to Write Bonds, Bills, Receipts, and Indentures.

The true Form of a Bond.

NOverint Univerſi per præſentes † me Johannem Truman de D. in Comitatu Kent, Yeoman, teneri & firmiter obligari Thomæ Rich de B. in Comitatu prædicto Generoſo, in Viginti Libris bonæ & legalis Moneræ Angliæ, Solvend. eidem Thomæ Rich, aut ſuo certo Attornato, Executoribus, Adminiſtratoribus, vel Aſſignatis ſuis, ad quam quidem ſolutionem bene & fideliter faciendum ‖ obligo me, Hæredes, Executores, & Adminiſtratores * meos firmiter per præſentes ‖ Sigillo meo Sigillat. Datum

Viceſimo

Vicessimo die Decembris Anno Regni Domini & Dominæ nostri Gulielmi & Mariæ Dei Gratia nunc Regis & Reginæ, &c. secundo Annoque Domini, 1690.

† *If two or more be bound*, nos.
‖ *If two or more*, Obligamus nos & utrumque, *or* quemlibet nostrum.
* *If two or more*, nostros & utriusque, *or* cujuslibet nostrum, per se pro toto & in solido.
‖ *If more be*, Sigillis nostris.

THE Condition of this Obligation is such, That if the above bound *John Truman*, * his Heirs, Executors, or Administrators, † do, and shall well and truly pay, or cause to be paid unto the above named *Thomas Rich*, or to his certain Attorney, Executors, Administrators, or Assigns, the full and just sum of Ten pounds of good and lawful Mony of *England*, on or before the Twentieth Day of *June*, next ensuing the date of these presents, without fraud or further delay, then this Obligation to be void, and of none effect, or else to be, and remain in full power, force, and virtue.

Sealed and Delivered
in the Presence of

* *If there be more than one bound*, their.
† *If more*, *add*, or any of them.

But to English *the foresaid Obligation, in part.*

KNow all Men by these Presents, that I *A B.* of *C.* in the County of *D.* Gentleman, am firmly bound and obliged unto *E F.* of *G.* in the County of *H.* Yeoman, in one hundred pounds of good and

lawful Mony of *England*, to be paid to the said *E F*. or to his certain Attorney, Executors, Administrators, or Assigns, to which Payment well and truly to be made, I bind me, my Heirs, Executors, and Administrators, firmly by these Presents. Sealed with my Seal, dated the first Day of *April*, in the Year of the Reign of *Charles the Second*, King of *England*, &c. the 36*th*. in the Year of our Lord, 1685.

Note, That if your Condition is to pay 20 *l*. then set 40 *l*. in the *Latin* Obligation, and if you are to pay the 20 *l*. at several Payments, remember you can sue upon the Bond but once.

A Bill Obligatory with a Penalty.

KNow all Men by these Presents, That I *John Thompson* of *L*. in the County of *Nottingham*, Gent. do owe, and am justly Indebted to *Thomas Williams* of *H*. in the County of *Surrey*, Yeoman, the full Sum of Ten pounds of lawful Mony of *England*, to be paid unto the said *Thomas Williams*, or to his certain Attorney, Executors, Administrators, or Assigns, on or before the Ninth Day of *June* next, ensuing the Date hereof, To which Payment, well, and truly to be made, I bind me, my Heirs. Executors, and Administrators, in the full Sum of Twenty Pounds of like lawful Mony of *England*, firmly by these Presents. Sealed with my Seal. Dated the third day of *April*, in the Second Year of the Reign of our Soveraigns *William* and *Mary* King and Queen of *England*, &c. *Annoque Dom.* 1690

Sealed and Delivered in
the presence of

A Receipt for Rent.

August the 4th. 1690.

REceived then of *William Burges*, the Sum of Seven pound ten Shillings, in full for a Quarters Rent for his House, due at *Midsummer* last.

l.	*s.*	*d.*
7	10	00

I say Received by me *Thomas Fan.*

An Acquittance in full.

REceived *June* 10, 1690. of *Thomas Norris*, the Sum of Five pounds in Mony and Goods, which is in full of all Accounts whatsoever, from the said *Thomas Norris* to this Day: I say, Received in full,

By me *Thomas King.*

A General Release.

KNow all Men by these Presents, that I *VV. M.* of *VV.* in the County of *B.* Gent. have remised released, and quite-claimed, and by these Presents do remise, release, and for ever quite-claim unto *E. S.* of *N.* in the County of *H.* Yeoman, his Heirs, Executors, and Administrators, all and all manner of Actions, Suits, Cause and Causes of Actions and Suits, Bills, Bonds, and all other Writings and Accounts, Debts, Dues, and Reckonings, Sum and Sums of Mony, Controversies, Judgments, Executions, Statutes Merchant, and of the Staple, Outlawries, and all other Claims and Demands whatsoever,

ever, which I the said *W. M.* ever had, now have, or which I my Heirs, Executors, Administrators, or Assigns, at any time hereafter may, might, or could have, to, with, or against the said *E. S.* his Heirs, Executors, or Administrators, for or by reason of any matter, cause, or thing, from the beginning of the World, until the Day of the Date hereof: In Witness whereof, I the said *W. M.* have hereunto set my Hand and Seal, this Tenth Day of *November*, in the Second Year of the Reigns, *&c.* *Annoque Dom.* 1690.

The Form of an Indenture.

THIS INDENTURE witnesseth, That *John Man*, Son of *Thomas Man*, late of *G.* in the County of *Surrey*, Yeoman, hath put himself, and by these Presents doth voluntarily put himself Apprentice, to *John Oliver* of *N.* in the County of *L.* aforesaid, Butcher, to learn his Art, after the manner of an Apprentice to serve him, from the Day of the Date hereof, for, and during the Term of Seven Years from thence next following: During all which said Term, the said Apprentice his said Master faithfully shall Serve, his Secrets keep, his Lawful Commands every where obey. He shall not do Damage to his said Master, nor see to be done of others, without letting, or giving notice thereof to his said Master: He shall not waste his said Master's Goods, nor lend them unlawfully to any: He shall not commit Fornication, nor contract Matrimony, within the said Term: At Cards, Dice, or any unlawful Game, he shall not play, whereby his Master may have damage, with his own Goods, or others: He shall not absent himself Day nor Night from his said Master's Service, without his leave, nor haunt Ale-houses, Taverns, nor Play houses, but in all things behave himself as

a faithful Apprentice ought to do, during all the said Term: And the said Master shall use the utmost of his Endeavour, to teach, or cause to be Taught, or Instructed, his said Apprentice in the Trade or Mystery that he now followeth: To find, and provide for him sufficient Meat, Drink, Apparel, Washing, and Lodging, fitting for an Apprentice, during all the said Term. And for the true performance of all and every the said Covenants and Agreements, either of the said Parties Bind themselves unto the other by these Presents. In Witness whereof, they have interchangeably set their Hands and Seals this Tenth Day of *June*, &c.

Sealed and Delivered
in the presence of

The Form of a Letter of Attorney.

KNow all Men by these Presents, That I *S. B.* of *&c.* Yeoman, have named, and constituted, and by these Presents, do name, ordain, appoint, and make my trusty Friend *J. S.* of *L.* Merchant, my true and lawful Attorney, for me, and in my Name, and to my use (or if so intended—*But to his own proper use*, without rendering any account) to demand, sue for, recover, and receive of *R. S.* of *M.* &c. the Sum of Twenty Pounds, justly to me due, and owing by, and from the said *R. S.* Giving, and hereby granting unto my said Attorney, full power and authority, to use and execute all such Acts, Things, and Devices in the Law, as shall be necessary for the Recovery of the said Debt; and Acquittances in my Name to make, or any other Discharges to give, and generally to do and execute in the Premisses, as fully as I my self might, or could do, being personally present, ratifying, confirming,

and

and allowing all and whatsoever my said Attorney shall lawfully do, or cause to be done therein. In Witness whereof, I have hereunto set my Hand and Seal this 10th Day of, *&c.*

A Condition to save harmless a Parish, from a Poor Family.

THe Condition of this Obligation is such, That whereas the abovebound *A. B.* is lately come to dwell, and Inhabit in the Parish of St. *P.* within the Town of *B.* above mentioned; now therefore if the said *A. B. M. B.* his Wife, or any Child, or Children of them the said *A. B.* and *M.* his Wife shall not, or do not at any time hereafter become charged or chargeable, to or for maintainance, for or by reason of such their dwelling and Inhabiting in the Parish aforesaid, then this Obligation to be void, or else to remain in full force and virtue.

Sealed and Delivered
in the presence of

A Condition for the Delivery of Malt.

THe Condition of this Obligation is such, That if the above bound *A. B.* his Executors, Administrators, or Assigns, do, and shall well and truly deliver, or cause to be delivered unto the above named *C. D.* his Executors, Administrators, or Assigns ten Quarters of good sweet Winter well made and dryed Malt, every Quarter to contain Eight Bushels, on the Nine and twentieth Day of *September*, next ensuing the Date hereof, or sooner, if the said *C. D.* his Executors, or Assigns shall require the same, or any part thereof, frank and free without any thing therefore to be paid, without fraud, or coven,

covenant, That then this present Obligation to be void and of none effect, or else to stand in full power, force, and virtue.

Sealed and Delivered
in the presence of

The *Latin* Names for the Days of the Month, and Mony set in *Latin* Bonds.

1. DAt. primo die } Dated the first Day.
2. Secundo
3. Tertio
4. Quarto
5. Quinto
6. Sexto
7. Septimo
8. Octavo
9. Nono
10. Decimo
11. Undecimo
12. Duodecimo
13. Decimo tertio
14. Decimo quarto
15. Decimo quinto
16. Decimo sexto
17. Decimo septimo
18. Decimo octavo
19. Decimo nono
20. Vicessimo
21. Vicessimo primo
22. Vicessimo secundo
23. Vicessimo tertio
24. Vicessimo quarto
25. Vicessimo quinto
26. Vicessimo sexto
27. Vicessimo septimo
28. Vicessimo octavo
29. Vicessimo nono
30. Tricessimo
31. Tricessimo primo.

Latin Names of Mony.

20 shillings, Viginti. solidi
30 Triginti. solidi
40 Quadraginti. solidi
3 *l.* Tres libris
4. Quatuor libris
5. Quinque libris
6. Sex libris
7. Septem libris
8. Octo libris
9. Novem

9. Novem libris	100 *l* Cent. libris
10. Decem libris	200. Ducent. libris
11. Undecem libris	300. Trecent.
12. Duodecem libris	400. Quadringint.
14. Quatuordecem libris	500. Quingent.
20. Vigint. libris	600. Sexcent.
30. Trigint. libris	700. Septingent.
40. Quadragint. libris	800. Octingent.
50. Quinquagint. libris	900. Noningent.
60. Sexagint. libris	1000. Mille libris
70. Septuagint. libris	2000. Duo Mille
80. Octogint. libris	3000 Tres Mille
90. Nonogint. libris	4000. Quatuor Mille, *&c.*

Sometimes Bonds are Dated in *Latin* thus,

Anno Domini Millesimo Sexcentesimo Nonogesimo, that is, In the Year of our Lord, 1690.

It is not much material to write the Names of Men in *Latin*, but it is good to Name the Parish, as,

T. R. de Parochia Sanctæ Mariæ.
T. R. of the Parish of St. *Maries.*

In Villa Bedfordiæ
In the Town of *Bedford.*

In Com. Bedd. &c.

Dear

Dear Father and Mother,

AFter my most humble duty to you, and my true Love to my Brothers and Sisters, and to my Uncle and Aunt, hoping you are all in good health, as I, and my Master, and his Family, are at this present time, (thanks be to God) These are to let you understand, that I received your Letter dated the 5th of this month, together with the Paper and Books you sent me, for which, and also for the many other testimonies of your Love) I return you thanks, and hope that happy progress I have already made in my Learning, may in the end answer your careful Expectations, and in some measure requite all your Care and Tenderness shewed towards me. I beg your Prayers to God, for his Blessing on my weak Endeavours, that you may at length reap the Harvest of your Expectation with joy, and God have the glory, to whose protection I commit you, and remain

Bedford, June, 5, 1687. *Your Dutiful Son* A. B.

Another Letter of a Scholar to his Parents.

Honoured Father and Mother,

YOur kindness calls for my dutiful acknowledgment, I wish I could better answer your Love to me, and your Cost upon me. The encrease of my Learning is by me endeavoured, and in some measure pressed after; I trust I shall have the constant assistance of your Prayer to God for the accomplishment thereof, in the Confidence of which, I humbly take my Leave, and Rest

July 3d. 88. *Your Dutiful Son*, C. D

A Brief Relation of the first Inhabitants of England, *collected from divers Authors.*

HIstorians report that *Gomer* the eldest Son of *Japheth*, the Son of *Noah*, gave name to the *Gomerians*, who filled almost this part of the World; leading (as *Vilichius* saith) in the 10th year of *Nimrod*, a Colony out of *Armenia* into *Italy*, which of *Gomer* were called *Combri*, and afterwards *Cimbri*; whence such as departed from *Italy* went into the North parts, and gave it the Name of *Cimbrica*, or *Chersonerus*, from whence the *Britains* proceeded; who came over at first from the Continent of *France*. *England* was anciently called *Cumbri*: These *Britains*, as I may call them, were then as wild in many things as the *Indians* in *America* are now, as in cutting, marking and painting their Flesh, and going naked.

Their married Women were known by having on their Shoulders, Elbows, and Knees, the Pictures of the Heads of Lions, Gryphons, and the like; on their Bellies the Sun with its Beams, and and on their Paps the Moon and Stars.

The Virgins had on the shapes of divers Flowers, made on them while young, by raising the Skin, and colouring it with the juice of Herbs, which remained on them some years.

The men were very horrible to look on, having on their Flesh the Pictures of ugly Beasts, as Serpents and the like.

Their Idols to whom they sacrificed mens flesh, were almost in number to the Idols of the *Ægyptians*.

The

The Men and Women were swift of Foot, warring with their Enemies in Waggons and Chariots armed at the end of the Axle-Trees with Hooks and Scythes of Iron, which, with the rattling of their Chariot wheels, amazed their Enemies.

This Land has been conquered 5 several times, First by the *Romans* under *Julius Cæsar*, who made the first attempt upon it 51 years before the birth of our Saviour Christ. He subjected it to the *Roman* Yoke, and caused them to become tributary to the *Romans*, who often defended them from the *Picts* and *Scots*, who came out of *Scotland*, and robbed and spoiled the Country; to prevent which *Severus* one of the *Roman* Emperours caused a wall to be made from Sea to Sea between *England* and *Scotland*, that is from *Eden* to *Tine*.

The first Conquest of the Britains *by the* Romans, *who were here* 483 *years; who enjoyed a yearly tribute of* 3000l.

Divers of the Emperours were here in person, as *Alexander* and *Severus*, who is reported to be buryed at *York*, *anno* 236. Here also was *Constantius* Father to *Constantine* the great, he from hence marryed *Helena* a woman of this Land, who was afterward Mother to the renowned *Constantine*, (from whom *Constantinople* had its name, the chief City of the great Turk.)

But when the *Roman* Empire was much weakened, partly by their own discord, and partly by the irruptions of the *Goths* and *Vandals*, and such like Invaders, the *Romans* were forced to recall their Soldiers from *Britain*, after they had ruled 483 years, and so leaving the Land naked, the *Scots*, and certain of the same Country, called *Picts*, did break in, who miserably wasted and spoiled *England*.

The second Co... by the Scots *and* Picts, Anno 447.

After the Reign of three Kings, the *English* threw off the *Danish* yoke, and the *Saxons* were re-enthron'd.

Note, That it is said of King *Edgar* that he built above four several Monasteries, and some other Kings were, in their Ignorance, so devoted to the Popish superstition, that they resigned their Crowns, and superstitiously travelled to *Rome*, there to lead the lives of Private Men.

Kings superstition.

Also *Canutus* the *Danish* King, being taught by wise men, that St. *Peter* had received from Christ the great power of binding and loosing, and that he was also the Key bearer of Heaven Gates, for which cause (lest St. *Peter* should not open the same unto him, when he should come thither) went Pilgrimage to *Rome*, *&c.*

The 5 and last Conqnest by William *the Conqueror.* Anno 1066.

The Fifth and last Conquest was by the *Normans*, under the leading of Duke *William* of *Normandy*, who pretending he had right to the Crown of *England*, by promise of Adoption, or some other conveyance from King *Harold*, did with his *Normans*, *Anno* 1066, in 896 Ships arrive at *Pensey* in *Sussex*, and obtained a great victory *October* the 14th. in which were slain *Harold* with 66000 of the *English*. *William* took upon him the Kingdom by Conquest, and did indeed behave himself like a Conqueror, for he seized all into his hands, gave out Barons, Lordships, and Mannors from himself; reversed the former Laws and Customs, and instituted here the manners and orders of his own Country, which have proceeded on; and been by little and little bettered to this day.

Thus you may see, the English blood, at this day is a mixture chiefly of *Normans* and *Saxons*, not without a tincture of *Danish*, *Roman*ish and *British* blood. As saith an Author.

A

Place this Page 43

A MAPP OF ENGLAND

R Stands in Rutland Shire Because there was not Room to write ye name at length and H in Huntington Shire B in Bedford Shire M in Middlesex F in Flint Shire

A Description of the Map.

BY this small Map of *England* and *Wales* divided into Shires or Counties, one that hath but small skill in Maps, may at first view perceive what Shires are situate next the Sea, and how they lye one from another, and from *London.*

England being as an Island, *Scotland* lying on the North of it, parted by the Rivers *Solway* and *Tweed*, the Brittish Sea or Channel next to *France* on the South, the Sea next unto *Holland* on the East; and the Irish Sea on the West.

The Length of *England* from South to North is 320 Miles, the broadest place from Lands end in *Cornwal* to *Sandwich* is 280 Miles; the next broadest place is between St. *Davids* and *Yarmouth*, which is estimated 245 Miles. The Circumference of it is about 1300 Miles. It is esteemed about the thousandth part of the Globe, or whole world, and the 333d. part of the habitable Earth; almost 10 times as big as the *United Netherlands*, five times as big as the *Spanish Netherlands*, less than *Italy* by almost half: it is accounted in proportion to *France* as one to five.

England is situate between the Degrees 16 and 21 Longitude, equal with *Scotland*, *Normandy*, and *Brittany* in *France*, and between 50 and 52 Degrees of Northern Latitude, equal with *Ireland*, *Flanders*, *Zealand*, *Holland*, Lower *Saxony*, and *Denmark*.

The longest day in the Northern part, 16 hours, 44 minutes, and the shortest 7 hours, 6 minutes.

The number of Shires in *England* and *Wales* are 52, Parliament men 496, Barons of the Cinque Ports 16, Hundreds 768, Market Towns 713, Parishes 9241, Bishopricks 24, Castles 186, Rivers 555, Chases 13, Forrests 68, Parks 781,

Cities

Cities 25, Bridges 956, and Universities 2.

The Shires were first made or divided by King *Alfred*, (about the year 880 after Christs birth) for the easier and speedier administration of Justice; he also divided the Families of his Subjects into Tens, or Tythings; or a company of men with their Families joyned together in a Society, the chief whereof was called a Tything-man; so that ten Housholds was a Tything, ten Tythings is called an Hundred, being part of a Shire, as *Bedfordshire* is divided into nine parts or Hundreds.

These Hundreds or parts of Shires, are called Wards in *Cumberland*, *Westmorland*, *Durham*, and *Northumberland*.

Characters, or short Writing.

The Explanation.

ON the left side of the long Square of Characters is set the Figures 1, 2, 3, 4, against the figure 1 in the first row are the 24 Letters, with the Characters belonging to them, which must be often writ over to have them ready in memory, this I call the first Lesson.

Secondly, against the figure 2 are the double Consonants, which is the second Lesson; they are to be made without taking off the Pen.

Thirdly, against the figure 3 are the places of the Vowels, as a, e, i, o, u, without which no word can be written at length, as for Example, against the figure 3 is set B, and between the B and the figure 3, the Character of B, with a, e, i, o, u, against it, as a on the top, e a little beside the top, i, against the middle, o, against the bottom, and u, just under the bottom of the B. At the end of a word a dot in the place of a, stands for a, as B

is

1

a b c d e f g h i k l m n o p q r f t v w x y

2

bl. br. cl. cr. dw. dr. fl. fr. gl. gr. kn. pl. pr. sk. sm. sn.

st. str. tr. ld. lk. lm. ln. lp. ls. lst. mp. nd. ng.

ns. nst. rd. rk. rm. rp. rs. ch. sh. th. wh.

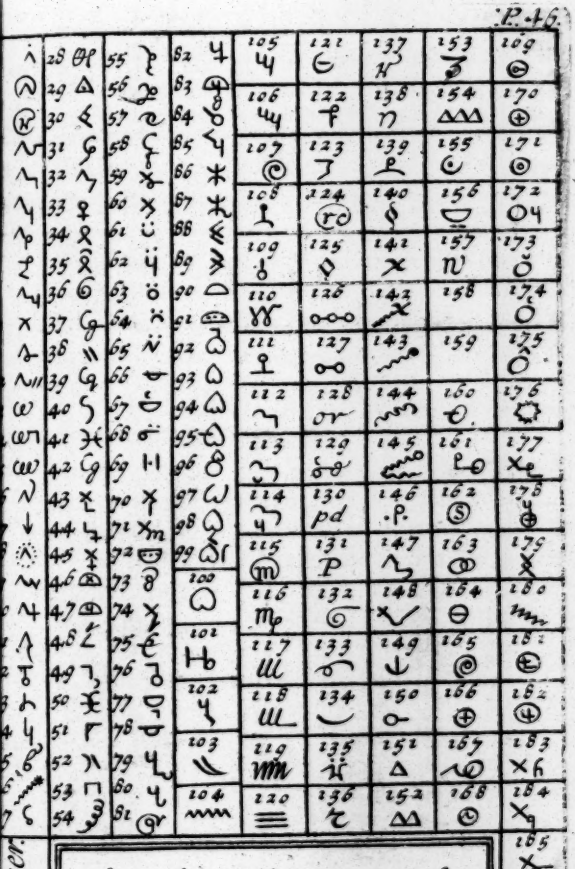
3

nut

nat		bad		quiet		be	
net		bed		sion		by	
nit		bid		Riot		say	
not		bod		Iool		we	
nut		bud		Dial		go	

4

com, cm		cor		col		out		Iudge	
circum		mount		for		ark		bredth	
trans		tent		liber		ebb		short	
ference		soever		ful		air		speech	
fulness		able		suff		ease		whence	
servic		city		little		odd		France	
ternal		sent		ment		ear		jar	
ture		sion		ness		us		who	



The Lords Prayer.

is
Bi,
lov
els
Vo
gur
Ch
tha
and
Ag
fet
set
son
in
per
ma
&c

be
no
so

on
A
th

ac
all
ac
al
B
be
bu
bu
bo
bo
B
B
B

is Ba, or B. with a dot on the side thereof signifies Bi, or By, or you may when another Letter follows the Vowel place the other Letter in the Vowels place, as bd is bid, because the d stands in the Vowel i's place, and under the B, against the figure 3 is nat (⌣) first the Character N, then the Character T, is set in the place of a, and below that is the Characters Nut, thus T̲. N, set first and T is set in the place of U being under the N. Again in the same lesson is the word (*Sion*) for S I set down the Character S, then in the place of i I set the double Letters *on*, the last word in this Lesson is go, for which is the Character g, and a dot in the place of o. Having learned these 3 Lessons perfectly, the fourth will be easy, for they are all made up of Letters, except 3, that is the Characters for *ture*, *mount*, *tent*.

Note that the first Letter of a word ought to be somewhat bigger than those that follow, and note that u always follows q, in all words, therefore need never be written immediately after q.

Neither is true spelling minded in this art, but only the sound of the word, as for Author write Ather, and abbreviate all the words you can as these following words show.

acquaint, aquant.
alledge, aleg.
access, aces.
alter, altr.
Baal, *Bal*.
beauty, buty.
build, bild.
buy, bi.
bought, bot.
borrough, buro.
Bricks, brix.
Balme, bam.
Blocks, blox.
clean, clen.
Calf, caf.
choler, coler.
debt, det.
doubt, dut.
double, dubl.
Daniel, *Danl*.
extream, xtrem.
excell, xcl.
elders, ldrs.
flatter, flatr.
fight, fit.
Philip, *Filip*.

Glo-

Glocester, *Gloster*.
happy, apy.
harbour, harbr.
Hannah, *Hana*.
James, *Gems*.
liberal. librl.
Leopard, lepar.
labour, labar.
massacre, masacr.
might, mit.
neighbour, nibor.
Pharaoh, *Faro*.
perfect, perfit.
Psalm, Same.
Psalter, Satr.
people, pepl.
reckon, rckn.
Rock, Rok.
resign, resin.
Reign, Ren.
Rhime, Rim.
subtil, surl.
Shiloh, *shilo*.
signe, sin.
slaughter, slatr.
streight, strit.
thought, thot.
victual, vitl.
view, vew.
wrought, rot.
and the like.
For Ph. write F.

The Use of the Second Part, or Table of Characters.

The Figures by each word that follows directs to the Table, for the Character belonging to the same word.

1 Above, because there is a dot above the a.
2 about.
3 round about.
4 all along.
5 after.
6 against.
7 action.
8 admonish.
9 anger.
10 anointed.
11 Apostle, appear, Apll.
12 altogether.
13 Angel.
14 Angels that fell.
15 Arch-angels.
16 ascend.
17 Anchor, or Dart.
18 abundance.
19 allowance.
20 Antichrist.
21 accompt, accomplish.
22 Baptism.
23 baptize.
24 begin.
25 bondage.
26 Blazing-star.
27 Catholick.
28 counsel.
29 Congregation.
30 Coherence.

30 Coherence.
31 Consideration.
32 covenant.
33 crucifie.
34 compass —— es.
35 compassed round.
36 circumcision.
37 concupiscence.
38 companions.
39 Conqueror.
40 contradiction.
41 Christian.
42 Children of God.
43 Christ Jesus.
44 Jesus Christ.
45 Christ on the Cross.
46 Christ in Heaven.
47 God in Heaven.
48 Habit, or Cohabitation.
49 bound, or confound.
50 neither circumcision, nor uncircumcision.
51 condemn.
52 diminish.
53 dignity, or condemn.
54 Devil turneth himself into an Angel of light.
55 dissolution.
56 dispensation
57 Dragon
58 { countenance, discountenance.
59 example.
60 extinguish.
61 the eyes of the Lord.
62 the eyes of God.
63 the eyes of the world.
64 the eyes of the King.
65 the eyes of the Nation.
66 elect, election.
67 over the Earth.
68 the eyes of the people.
69 enter in at the streight gate.
70 excommunication.
71 examination.
72 there are 3 that bear witness in the Earth.
73 escape.
74 external, eternal.
75 Evangelist.
76 Foundation of the World.
77 Foundation of the Earth.
78 from one end of the Earth to the other.
79 General.
80 glory, glorification.
81 govern —— er.
82 God in Christ.
83 God in Heaven and Earth.
84 Heretick.
85 Holy Ghost.
86 Hypocrite.
87 Hypocritical.
88 Right hand.
89 Left hand.
90 Heaven or Sky.
91 there are three that bear record in Heaven.
92 false heart.
93 an upright heart.
94 a double heart.

95 en-

95 entered into the heart
96 heart set above the World.
97 a broken heart.
98 a hard heart.
99 a contrite heart.
100 an evil heart.
101 *Hebrew.*
102 Judgment.
103 Ignorance——nt.
104 Innumerable.
105 Judgments of God.
106 bring down the Judgments of God.
107 intangle.
108 Idolater, Idolatry.
109 Idol.
110 integrity.
111 Image.
112 Kingdom.
113 Kingdom of God.
114 Kingdom of Heaven.
115 Magistrate.
116 Ministration.
117 Mistake.
118 a great mistake.
119 Multitude.
120 mingle.
121 in the middle.
122 nevertheless.
123 notwithstanding.
124 overturn.
125 order.
126 opinion.
127 opposite, or opposition.
128 Pray or Prayer.
129 over the people.
130 predestinate.
131 Prince.
132 proportion.
133 providence.
134 long, or prolong.
135 Resurrection.
136 reprobate.
137 revelation.
138 ridiculously.
139 stand on the ground.
140 section, sathan.
141 sword.
142 flaming sword.
143 Serpent.
144 break the head of the Serpent.
145 old crookedSerpent.
145 on each side,or both sides.
147 abound, super-aboundant.
148 excellent, or super-excellent.
149 Ship, or Boat.
150 things.
151 triangle, or tent.
152 Tabernacle.
153 3 persons in Trinity.
154 Church, Temple, Synagogue.
155 The greatest part of the Earth.
156 under the earth.
157 wonder, wonderful.
158 the beginning of the world.
159 the end of the world.

160 entred

160 entred into the world
161 Sin entred into the world.
162 this world.
163 the other world.
164 from one end of the earth, or world to the other.
165 world without end.
166 Cross of the world.
167 All the world.
168 All that is in the world.
169 things that are in the world.
170 Christ came into the world.
171 round about the world.
172 without God in the world.
173 to live above the world.
174 overcame the / over the } world:
175 above the world.
176 Wilderness, Desart.
177 Exactness.
178 God in Christ reconciling the world to himself.
179 Marriage, Wedlock.
180 wavering, unconstant.
181 Christ came into the world.
182 Christ Jesus came into the world.
183 exchange, barter.
184 execution, executor.
185 exception, except.
186 expectation.
187 Extraordinary.
188 *Zerubbabel.*
189 experience.
190 Omnipotent.

Note, That the way to be perfect in Characters is the often writing them over, therefore let the young Learner write out in a Book all the Characters in the Tables before, and set the words to each, as the figures direct.

The following Table is made up of Marks and Characters.

know, knowledge
law
lord
not
or
pass
Remember
sin
that, yt
thee, ycc
them, ym
then, yn
these
thou yu
those
this
there yr
to
verse
under
youth
vulgar
wisdom
walk
what
when, wn
where, wr
whom, wm

o which
y yee
y your
r

AB Abomination
Mr { Minister / Administration
Ades Administrators
B Babylon
B Babylon is fallen
ꝑ Backwards
Bp Bishop
bl blaspheme
bt obedient
Z Beelzebub
) contrary
cc Crown
C Conscience
X Christ
d' distress
ddr drunkenness
Dr Doctor
Mr Master
Mrs Mistriss
Esq Esquire
Sr Sir
St Saint
Col. Collonel
Capt. Captain
Lieut. Lieutenant
A. D. The year of our Lord
MS a written Book
Qu. Question
Sol. Answer
= even or equal
≠ uneven
Ecc. Ecclesiastes

(E) Ever-

(E) Everlasting
⅂ for, forbear.
ɣ God. ɣ Gods.
G gentle, or Gentleman.
⊔ Garden.
ɣ grace, gracious.
G great G od.
ɣ most high God.
⟨ him
h handful.
Hobl. Honourable.
Hod, Honoured.
⟨ ⟨ hand in hand.
H Hospital.
K great King
⌣ great Lord.
Lps. Lordships.
Lr. Letter.
My Ministry.
M. Majesty.
Ma. magnifie.
⁝ manifold.
N number.
ob objection, half penny.
σ past.
p principal.
pd. paid.
p priviledge.
P Prerogative.
q quantity.
qr quarrel.
S. Sacrament.
ϕ Sacrifice.
ll Similitude.
▭ square, 4 square.
Sb. Sabboth.
sp. spirit, speech.
sy, syrup.
T taught.
wp. worship ——— full.
wl. would.
viz. that is to say.
ag. against.
Comes. Commissioners.
Md. memorandum.
qr. quarter.
Doct. Doctrine.
Exon. Exeter.
Bucks, Buckinghamshire.
Salop, Shropshire.
Oxon, Oxford.
7ber. *September.*
8ber. *October.*
9ber. *November.*
10ber. *December,*
&c. and so forth.

Note, Though I have run out this Table, out of plain Characters, it is because I would have every one take what marks for words he pleaseth, therefore it will be very needful for the young Learner to write out a Table, (by the foregoing Rules) according to his own fancy, in an Alphabetical order.

Again.

When words are repeated, as Eye for Eye, &c. write down the word once, and draw a line under it, as

ey Eye for Eye.
ζ Hand for Hand.
vr. verily, verily.

Sometimes words are repeated 2 or 3 times together, put 2 lines under, as

(or) { overturn,
overturn,
overturn.
holy, holy, holy.

MA { the Temple of the Lord.
the Temple of the Lord.
the Temple of the Lord.

When words end with s. sometimes set a dot on the left hand, as .Ψ Gods.

Stops in writing are:

And words of contrary, as good and evil, first write one of the words and draw a line, against which set this contrary) or c backwards, thus.

Ψ, ———)good and evil.
or ———) poor and rich.
ζ . ——) high and low.

Repetitions between words may be often left out, as in *Phil.* 4 8. and draw a Line therefore, as; Whatsoever things are true ——— honest —— just ——— pure ——— lovely ——— of good report, &c.

Verses may be figured thus, (1) (2) (3) &c.

Lastly, For all other long words, marks may be invented with ease (after you have learned the foregoing Rules) or part of words may often serve, instead

instead of the whole, (so as you can but bring what you have written, in haste, into sense) as for Righteousness write rit, or r.; for remember rm, or rl ; for friendship write friend, as ידיד which will easily be understood, so as you learn every thing in order as they lye.

Which done, begin to write every day a Psalm over, and as hard words come, look for them in the Tables, which if you find it not there, you may invent marks for them.

But such as can write a quick common hand, and have no fancy to learn Characters may abbreviate all long words (as some words are in the Tables before) writing only the chief Consonants, leaving out all the Vowels, except some few that begins the words. As for

Abraham write *Abrm*, for lament write lmt, for *Genesis* write *gns*, and the like ; which will be well enough, if you can read what in haste you have written after Sermons, Speeches, *&c.* for it's very seldom konwn that one man can read the Characters of another mans writing, that was writ in haste.

SOME

Monthly Obſervations

For the Lovers of Gardening:

To which every one may add (to each month) according to their own Obſervation.

That the beſt Time, or Seaſon, for Planting, Grafting, and Gardening, may not be omitted, through the Multitude of other Buſineſs.

January's Obſervations.

NEar the end of this month, gather grafts for grafting of Pears, Cherries, and Plums (each near a foot long) ſuch as are fulleſt of Fruit buds, bind them in little bundles, (each ſort by themſelves,) and put them half way to the tops in earth, till you uſe them.

Gather grafts.

Februarys

February's Obſervations.

IN this Month you may graft early, Pears, Cherries, and Plums, on their proper ſtocks. The manner of grafting in the Cleft, is thus.

Graft-ing in the Cleft.

Firſt, ſaw off the head of the ſtock in a ſmooth place, 3 or 4 inches above the root, for Wall Fruit Trees; but near a foot for Standards, ſmooth the head with a Knife, and cleave the head a little beſides the pith, and put therein a long wedge of wood, to keep the cleft open; then cut the graft on both ſides, from a Bud, or Knot, in form of a wedge, in length about an inch and an half, with ſhouldring, which place therein, ſo as the bark of both may exactly join.

If you do not ſet another graft in the other ſide the Cleft, cut off the place ſloping.

Laſtly,

Laſtly lay a piece of green bark on the Cleft, and cover it round with clay, well tempered with Horſe Dung, and a little fine chopt Hay, or Wool.

Pruning Wall Fruit.

About the end of this Month prune all your wall fruit (except the Vine) ſpreading the bows on the wall, like the ribs of a hand Fan, not letting the middle ſtem grow upright, but while the Trees are young, bow the head towards the Sun, and ſo nail them to the Wall (uſing pieces of woollen cloth for the ſame) what bows you take off, ſhould be taken off cloſe to the body or arms, not leaving ſtumps, cutting off the ends of all thoſe twigs as are too long, (and will not be got cloſe to the Wall) cloſe above a bred ſloping.

Pruning young Standards.

The young Trees (of about 4 years growth,) that were planted, to continue, in *October* before, and were a little pruned then, now cut each boughs, ſo as the heads may not be too big for the roots to maintain.

Pruning of old ſtandard Trees.

The pruning of old Apple Trees, *&c.* Cut up all the ſuckers (if any) that grow from the Roots, and all ſuch ſprigs that grow upright, either out of the head or arms of the trees, to a fruit-bud (if any) or elſe cut them off cloſe to the arms; and take off ſome of the under boughs, if need be. See more in *June*.

For the fewer boughs a tree doth bear, the fairer and larger will the fruit be.

Roſe trees.

With a Knife cut the tops of every Branch of the Roſe buſhes, cloſe above a bud, having clipt them before, (*viz.*) as ſoon as the Roſes were taken off them.

You may now ſet the cuttings and ſlips of Gooſeberries, Currents, Quinces, and ſeveral other things: but *October* is the beſt time.

About

About the end of this month, open the head of the pot of Wallnuts you buried in the earth in *November*. If any of them be chilled, take them all out and set them a foot asunder, the flat end of the nut downwards, the sprout upwards, and in 2 years they may be ready to innoculate, which will be a means for their timely bearing, at 2 years end take them up, and cut off the downright root of each plant very close, and the ends of all the small roots and boughs; then plant them at further distance, spreading their roots as is shewed in *October*. Gather grafts for Apple stocks, and set them in the earth, as was directed last month, sow parsley Seed.

Wallnuts.

March's Observations.

GRaft Pears on Pearsuckers, that have stood 2 years in your Nursery, but on Quiceestocks for Wall-Fruit Trees, which last being set deeper than ordinary in the earth, will take no harm, as the Apple-tree and other Trees will.

Now Graft your Crab-Tree stocks that have stood 2 years in your Nursery, or Garden, but if they are where they are to continue, and are set at 2 foot distance, may make durable Apple-trees, almost as durable as those that are raised of kernels, and were never grafted, which are called natural plants.

The largest sorts of Trees are grafted in the Crown, (so called) the way is thus.

Having

Having ſawed off an arm of the tree (which is much better to graft on than the body) near the head ſmooth it with a Knife, then take one of your Apple Cyenes or grafts, and cut it on one ſide from a bud, or a knot if you can, and cut a little of the bark of the other ſide; then put in a ſmall Iron wedge, ſomewhat bigger than the end of the graft, between the wood and the bark, then take out the wedge and ſet the graft in its place, rinde to rinde, and wood to wood, to the depth of about an inch and an half.

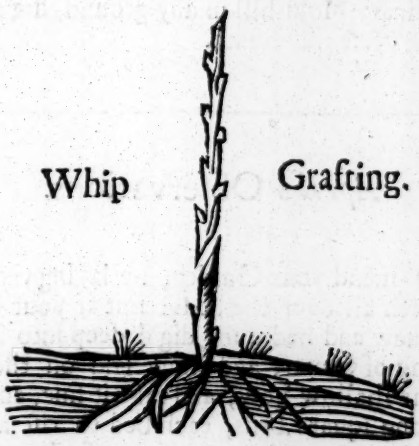
You may place more grafts in the ſame head, ſo that you rend not the bark, bind it up, as is ſhewed of cleft grafting.

The third way of grafting, is called whip grafting, done in the manner following.

Provided ſuch grafts or Cyenes (gathered and ſet in earth laſt Month as is ſhewed in *January*) as are in Subſtance to that part of the Stock whereit is to be cut off, being ſomewhat bigger then a large Swans Quill.

Then

Then choose a smooth place in the stock, and Cut it sloping about an Inch and half in length, and cut the graft with the like slope, (cut as if you were to tye together the joynt of a whip or angle almost) like the figure thereof in the Margent.



Whip Grafting.

Make them joyn so fit, (by several cuttings) with a sharp Knife, that bark may answer bark exactly ; Then bind it close with speed, using dry Flags Base, or thin Willow bark for the same, and clay it round as is shewed for Cleft grafting, the length of the graft the same with others.

The young Trees that was grafted the year before, being Standard Trees, cut all the branches off close to their bodies, and some off the top close above a bud ; or according as you would have it spread.

Pruning of Trees a year old.

About the middle of this Month you may sow Carrot seed in ground that has not been lately dunged, rub the seed well with ashes first and sow it thinly, with a little Radish and Lettice seed among it ; Parsnip seed should be sowed in good earth, sow Gilliflower seed; set Carrots and Turnips

nips to raiſe ſeed; ſet the ſlips of Box to make little ſquare hedges about graſs-plats being often clipt.

Now and the next Month ſet out your Cabbage plants in well dung'd earth, or lay dung round each plant; ſo as not to touch any. If you ſee an extraordinary Mold hill in any ground, dig and deſtroy the Neſt this month.

April's Obſervations.

NOW mend your Garden, by laying very good Earth all over the beds: But if your Garden place is new and had dung dig'd deep into it at the beginning of winter, and dung laid on the top, dig it but ſhallow now, and rake it fine, and tread it into long ſquare beds, each bed to riſe about 2 inches above the paths, and if you ſet boards of about 3 inches wide at the edges of your beds (the boards firſt done over with Lint-ſeed Oil, hard Rozen, and a little fine powder of burnt Umber, which ought to be laid on hot, which will make them laſt long,) and keep the earth from running into your little gravel paths, they will hold good to walk upon many years, if you keep out the weeds, and beat them with a wooden beater (being between wet and dry.)

And on the edges of the beds you may ſet the roots, or cuttings, or ſlips of Rue, Roſemary, Hyſop, Time, Thrift, Winter ſavory, Lavander cotton, or any of theſe, to make little ſquare evergreen Hedges (ſo called) if you clip them often, eſpecially after Rain, and ſet flowers in the beds; and on that ſide of your Garden where the wind commonly blows moſt, you may ſet a Pole or

Lath

Lath Hedge, and let grow through it Rose bushes, Currens, Lawrel, Phillirea, or what greens you can get.

In a wet season set into your Garden the best of your Gilliflower plants (sowed of seed the last month) about 6 inches asunder, and part the roots of several Garden heards, and flowers, as Lillies, Eminies, Hollyhocks, Flower-de-luces, French Cowslips, Sives, Garlick, and others; sow the seed of herbs, but Fennel at some out corner.

As soon as the Apricock, Peach, and Nectorines, begin to bloom, see if they do not want some pruning, rub off such buds as growing may deform the Trees; and if the nights be frosty and blasting, hang Mats or Blankets over all the blooms, taking them off in the day time: If you prune them not, till this time, they will not so soon blast by *May* frosts.

Apricocks, & Peaches.

Remember to take off the Litter, or Straw, you laid on the beds sow'd with kernels and stones, and the roots of Herbs before winter.

If the boughs of young Trees stand too near together towards the tops, draw them with chores at certain distances, and so to stand staid till the fruit appear, or blooms:

Now slit the bark of young trees from the head to the root, at 3 or 4 sides, but cut not into the wood.

Set more Cabbage and Colly-flower plants, which last, if Frost come, set 2 Tyles edgling over each plant; sow Onions seed, size them three inches asunder when come up.

May's Obſervations.

AT the beginning of this month, ſow Purſlin ſeed in well dung'd earth, now ſet Kidney beans.

To ſow Cucumber ſeed, dig a hole in the earth about 2 foot wide, and as deep in the middle, tread into it about a Scuttle full of Dung, on that as much good earth, in which ſet 4 or 5 ſeeds; if they grow too rank trim off ſome of the branches, and water them ſometimes.

Set more Colly-flower plants, which you may buy of a Gardener, if you have no hot bed of dung: you may now take up the roots of Daffodils, and keep them dry till *September*, and then ſet them: when you cut off the tops of Garden Beans, bury ſuch tops as have Gnats or black Flies on them.

June's Obſervations.

AT the beginning of this month, ſaw off all the ſtumps of your old fruit trees (within half an inch of the bodies) that you chopt in *October*, and cut off ſmoothly with a Chiſſel or Knife all places that you have ſawed off, as alſo all the dead ends of Twigs, that the Froſt has ſeared, cloſe to a bud ſloping, and cut off all cankered places to ſound bark, rubbing the wounds with dirt and ſoot, or Cow dung.

Beſt time to finiſh pruning of Trees.

Unbind

Unbind the grafts of Whip-grafting, and tye them slightly for a little time.

As soon as the seeds of Marygolds, Garden-poppies, Rosemary, and Box is ripe, sow the seeds, if you desire an encrease by seed.

If you desire large Gilliflowers, cut off most of the small Spindles, before the strongest Spindles flowers, and lay a little saw-dust to the roots.

Laying of Gilliflowers.

To Layer Gilliflowers chuse such slips or layers, as are the strongest, 4 or 5, or more of a root, prune the sides and ends of the Leaves with a Knife, and under the middle joynt, cut the stalk half through, slitting the same upwards, to the next joynt, then make a hole in the earth (as far of the root as the slip will reach) something wide, and gently bind it down therein, with a small hooked stick to keep it from rising, then turn up the head of the layer, that the slit may open (or bind it down when open) in which posture earth it up with willow earth, or other good earth, pressing it down very well about the Layer, and at night water them: The best time to layer, is from the middle of this month to the middle of next; the sooner the better, if the Layers be strong and well grown.

Vines.

About this time snap off at a joynt, or clip off the superfluous branches from your Vines (except here and there one that may be fit to nail to the Wall, instead of an old branch, which is not to be cut off till *December*, for fear it bleeds; but if your Vine happen to bleed, sear the wound with a hot Iron, and also clip off the Lances that twist like a worm, and when the Grapes begin to swell clip off more leaves, that not above two leaves shade each bunch the next month.

As soon as the Tulip hath cast its flower, break off the stalk in the middle, and as soon as the re-

mainder of the ſtalk is dry, take up the root (once in two years) with a long narrow Trowel, do ſo for the reſt of the Tulips, and lay the Roots in a window to dry about three weeks, and then take away the dead fibres and looſe outer skins, and ſuch off-ſets, or young Roots, as will eaſily part from the old Roots, and put each ſort into a paper bag by themſelves (and mark the bags) and hang them near a Chimney, and once in a month ſee if any of the Roots be mouldy; which wipe off, and dry them a little by the fire, and put them into the bags again. If you ſhade your Tulips with a Canvas, or the like, from the mid-day Sun, and ſometimes water them, they will the longer keep their flowers.

Tulip roots to take up.

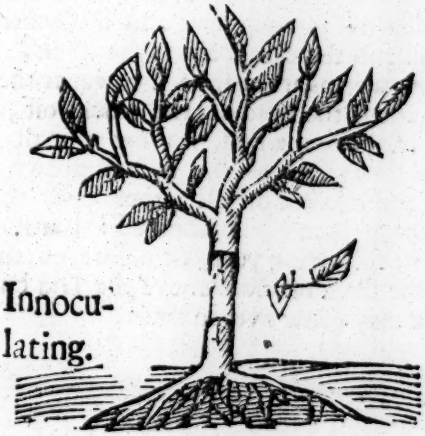
If you deſire Seed, chooſe ſuch as have ſtrong ſtalks, and the Seed-veſſel three-ſquare, and as ſoon as the Seed-veſſel begins to open, take them up with the Roots, and in *September* take the Seed from the Roots, and ſow the Seed then in a bed by it ſelf, covering the bed in froſt time with ſtraw, litter, or ſaw-duſt.

Tulip-ſeed.

The Peach, Apricock or Nectorine may be Innoculated on a young Plant of about two years growth, raiſed from their Stones (ſet in *October* or *February*) but rather from the Suckers or Stones of the white) or Black Pear-plum, or other white or large Red Plum. Tho ſome ſay, the Almond-plant is the beſt, yet 'tis ſomewhat tender.

Or Innoculate the beſt Peaches and Nectorines on a common young Apricock-tree, that was grafted low (or near the ground) on an ordinary Plum-ſucker: The doing thereof is thus: Chooſe a fair day, between the middle of this month and the middle of *July*; Go to a ſtock, and about 4 inches above the Root, and about a quarter of an inch below a bud, if you will) cut through the bark gently

tly crofs the ftock near an inch long, and another down-right cut about an inch and half long, almoft like the great Letter T, as may be feen alfo in the figure of a Tree in the Margent. Take heed that you cut not into the wood of the ftock, becaufe it fometimes caufeth Gun to arife to fpoyl the bud.



Innoculating.

This done, from the branch of an Apricock-tree, one of the fame years growth, choofe a bud that is not too young and tender, whether it hath a Leaf by it or no (is not much matter.)

Then about a quarter of an inch above the bud cut a crofs cut (as you did firft in the ftock) and cut the bark alfo on each fide the bud downwards, to end in a peak, fomewhat like a Boys taper Top, or the figure in the Margent.

Then with a Knife, that hath a fmooth back, gently drive off the bark with the bud on it, and leaf (if any) but if you fee a little hole on the infide of the bud, then hath it left the little root in the wood. Caft the bud away, and prepare another bud that hath a root; The bud with the bark

being ready, place the bark thereof within the cut of the ſtock, ſo that the edge of the bark that's above the bud joyn exactly to the upper edge firſt cut in the ſtock, then cloſe the bark of the ſtock over the bark of the bud, and bind it cloſe with baſt or dry flags, that nothing appear ſave the bud.

About 3 weaks after this unbind it (if the bud ſeems to be freſh) and tye it a little ſlacker for a time, and rub ſome Soot about the ſtock, if Flies or Canker-worms are near; and towards the ſpring of the year cut the head of the ſtock off, about half a foot above the bud, leaving a ſmall branch to be cut off as ſoon as the bud is grown out of danger, and alſo cut off all other buds that may hinder the growth of the true bud: Laſtly, in this month the following year, or before, cut the other part of the ſtock off cloſe above the ſaid bud, that the bark may grow over to cover.

July's Obſervations.

THoſe Gilliflowers that are apt to break pods, help them by cutting a little of the edges of the pods, at ſeveral places. Or before they open, put on each a piece of Aſh bark ſomewhat like a Taylors thimble: And forget not to finiſh the laying of them by the middle of this month: With a Chiſſel faſtned to a long ſtick, cut up the ſuckers from the Gooſeberry-buſhes to have large berries, and clip the heads round.

August's Obſervations.

About the middle of this month ſet the off-ſets, or young roots of your Tulips, you took from them in *June* laſt.

Sow Cabbage and Colly-flower ſeed, now lay the boughs of Roſemary, Bays, Tamariſk, Mulberries and divers others, as is before ſhewed of Gilly flowers, cutting off the tops of all layers, except greens.

Now is a good time to new make your Garden, (if need be) and dig good earth therein, chooſing a moiſt time, you may take up all your herbs and flowers with ſome earth about moſt of the roots, and ſet them in their place the ſame day or the next, and you may part the Roots of Pionies, Flower-de-luce, Lillies, and Crown Imperial, or take off-ſets from the roots; ſow Turnip ſeed, as is ſhewed in the general Obſervations; As ſoon as you have gathered your Roſes, clip the buſhes pritty near.

September's Obſervations.

About the beginning of this month cut up the roots of the Layers of your Gilliflowers, and take up ſome earth with each root, and ſet them about 6 inches aſunder in beds, or in crackt pots, or ſuch as have holes in the bottom.

Now

Now set the roots of your Tulips, that you took up as soon as their stalk was withered.

Set Cabbage plants in good earth, about half a foot asunder; and Lettices about the same distance to remain till the Spring.

October's Observations.

THE Stones, or Kernels of Almonds, Pears, Apples, Peaches, Apricocks, Cherries, Crabs, and Plums, sowed in Beds (each sort by themselves, as is directed in the general Observations) may raise stocks for Grafting and Innoculating, the earth need not be of the best, then cover all the beds with Litter or Straw, (which in *April* take off) and in 2 years may be ready to remove; Then cut off their downright roots close, and all other roots almost close, and side branches close to the bodies, and a little of the tops of each, then with a setting stick, set them near 2 foot asunder in rows, by a line (each kind apart) where in a year or 2 most of them may be ready to graft or bud.

Nursery of Plants.

This is a good time to set the cuttings, and slips of Gooseberries, Currents, *&c.*

To plant Trees of about 4 years growth (which should not be older, if you buy them to plant) first, cut off the downright root close, or bend it so in the setting that it may run sideways, if the Tree be very thin of roots; cut off the ends of every root and such as are broken, and too long, and also most of the small threds you find too long or too thick, and trim the head a little, and defer the

Planting Trees:

the full pruning thereof till *February* and *June*, because the winter frosts often causeth stubs of dead wood to appear where you cut, which sometimes turns to be a Canker'd place.

Then make a wide hole in the earth, and in the middle thereof raise a hill of good earth, whereon set the Tree a foot from the Wall (if it is Wall-Fruit) opening and spreading the roots round the said hill that one root touch not another; then cover the roots with good earth, shaking the Tree, that the roots lie not hollow, treading it down to fasten the earth about the roots.

To help old Fruit Trees.

Sometimes Trees bloom, but bear no fruit; to help which, some people do once in three years, in this month, lay bare the roots, and cut out worm-eaten places therein (if any) and the same week cover the roots again with fresh earth, or bury a dead dog or cat under the root, having cut off the downright root: However, if Trees thrive not well, it is very good to put fresh earth to the roots, taking the old earth away, if not, to spread dung once in 3 years all over the Orchard, leting neither dung nor grass touch the bark of the Trees. See *Feb.* and *June*.

Arms of Trees to cut off.

If your Fruit is small, it is a sign that the Tree has too many boughs, therefore in this month thin them, thus, take a Hatchet and chop off some of the under boughs or arms about a foot off the head or body of the Tree, especially such as are but little in the Sun, and so let the stumps rest till *June*, trimming some of the other boughs in *February*.

Gather Crab-Tree stocks to set in your Nursery, and store of Quince-suckers; to graft one Quince upon another do help their bearing: Cypress-trees are raised from seeds, sown about this time.

November's Obſervations.

AT the beginning of this month, take off the husks of ſuch Wall-nuts, as you intend to ſet (which ſhould not be husked before) the husks ſoak in water to keep to make Ink with: mix the Wall nuts with good earth in an old crackt pot or pail, bury the pot and Wall-nuts in the earth, ſo that the top of the pot may be within 3 or 4 inches of the top of the ground, and about the end of *February* do as is there directed.

To raiſe Wall-nut Trees.

Ferusalem Artichoaks are in ſeaſon to eat now, or any time before the Spring, ſet them in ſome by place where nothing but weeds uſe to grow, they are not ſoon deſtroyed if once taken root, take out the biggeſt yearly to eat.

Potatoes if they have not almoſt the full benefit of the Sun, come to little.

December's Obſervations.

NOw prune all your Vines (if not done the laſt month) and nail ſome of the ſtrongeſt young branches inſtead of ſome of the old, which may be cut off, for the fewer branches, and the thinner they are nailed on the Wall, the larger will the Grapes be.

Vine.

The

The cuttings of your Vines, you may make a Vineyard of, or set them in your Garden; let each set or cutting be about 2 foot long and full of knots, which set sloping half way into the earth, after a year or two, set two stakes to each plant, and guide the branches about them, lay rich dung and blood to the roots of your Vines, but let not the dung touch the bark.

Those that desire fair and large Grapes, nail the branches about a yard asunder on the Wall, and when the Grapes appear, give every one of the longest bearing branches a nail to the Wall; and in this month nail the said bearing branches (as before) to the Wall, cutting off all the oldest branches that may be in their way.

Some expert Gardeners, that have a considerable piece of ground to spare (especially gravel or sandy ground) do make a Vineyard of it, thus.

Take the cuttings of the old Vines, and plant them near a yard asunder, to walk in, to kill the weeds with a How, and to guide the shoots one to another, as also to set little Crutches to bear up the Grapes from the ground.

And yearly, when they begin to bud, as about the beginning of *April*, they cut off all the branches, excepting one stem to grow from each root about a yard long.

The late cutting keeps them back, otherwise the *May* Frosts may kill many of the young shoots, and though they bleed, it's said, it hurts them not.

Note, That those that can afford stakse, may set one by each plant, tying the top of the plant not to the stake by it, but to the top of the next stake, *&c.*

General Observations.

NOte, That it is most convenient to sow all seeds in little Furrows, or Trails (by a Line) made with a hoe or sticks end, for those that have but little ground, the Trails being at certain distances, as suppose you sow Turnip-seed in *August*, in Trails about a foot asunder, you may easily thin them, and hoe between the Trails in a dry time.

After a Shower. After a Shower of Rain you may easily draw the Weeds from your Flowers, and rub the Moss of your Fruit-trees with hair cloth, which is a good time also to clip herb hedges.

Herbs. Sow Spinnage, Corn-Sallet, Garden-cresses, and some other Sallet herbs, once in a month throughout the year, if Frost hinder not, likewise you may remove almost all sorts of very young Trees and Herbs that have roots, in a wet and warm season.

Beans, Pease. Set Garden Beans and Pease, every month from *September* to *May*-day, if Frost hinder not.

Strawberries. Cut off the strings of the Strawberry roots as often as they appear, and as soon as the berries appear, tye them up to sticks as you do Gillflowers, cut up the suckers from Gooseberry-trees.

Frost. At the beginning of Winter lay Saw-dust, or Wood-pile earth to the roots of Rosemary, Bays, Lawrel, Phillarea, and other that you have a great care for; and Litter upon the beds of Sparagus, and seeds lately sown.

The

The ſeveral things that devour Fruit, and that ſometimes kills Trees.

IF the Canker-worms roll up the leaves of your Trees, kill what you can, and ſquirt Water and Salt on the Wall-trees and new Inoculated buds, with a Boys Eldern Squirt (if you have no better) but if the Worms are much ſpread, ſmoke the Trees in a ſtill evening with Hemlock and other ſtinking weeds. *Canker-worms.*

When you find a hole, or Cankered place in any Fruit-tree, pick out the ſeeds of the Vermin, and cut the hole ſo that water may not lodge therein (if you can) and rub the place with ſoot; and in *June* do as is there directed. *Cankered places in Trees.*

Hares and Rabbets in a froſt ſometimes bark and ſpoyl young Trees: Anoint the bark with ſoot, blood and Hogs dung mixt together. *Hares hurt Trees.*

Note, that the late pruning of the Apricock and Peach-trees, doth often cauſe them to be the backwarder, and ſo not ſo ſubject to be blaſted by *May* froſts. See the directions in *April.* *Blaſts.*

When you find any Gum on the ſides of your Trees, cut it out cloſe. *Gum.*

Snails in one night do ſometimes eat holes in Peach, *&c.* After rain, or betimes in the morning, gather them, and give them to the Hogs or Ducks. *Snails.*

Piſs-ants are driven away, by caſting ſcalding water on their hills, or laying wood-aſhes on their holes. *Piſs-ants.*

Great Worms do harm, by drawing Herbs and Seeds into the earth: *Great Worms.*

Gather them in a wet evening or morning betimes; or they will come up, if you pour salt brine in their holes, or the water wherein Wall-nut husks or leaves hath been soaked.

Ear-wigs, Wood-lice. To destroy Ear-wigs and Wood-lice, which often creep under Bee-hives, Fruit, and Gilliflowers; set up sticks with Calf-hooks on them, into which they will shelter.

Spiders. Spiders do often Web over the Wall-fruit, and over the mouth of Bee-hives: Wipe them off once a week with a Beesom made of the tops of Reeds, gathered about *Michaelmas*; which is useful also to flack off dust from printed Maps, and the like.

Birds. Birds do often spoyl the buds of Wall-fruit, and the seeds of several things: Stick up where their haunt is, Lime-twigs, or Wheat-ears a little thrasht, each ear having straw about 4 inches long left on, to be lim'd, the Birds flying away with the ears, lime their wings: Thus made, take Bird-lime a quarter of a pound, and half an ounce of fresh Hogs seeme, melt them together.

Mice, Rats. Mice and Rats often spoyl Grapes and Bees: Mix a little Rats-bane with fresh Butter, and sinear the holes, or place where you are sure they must tread, to sinear their feet, which they commonly lick clean.

They that think I have written too short of Planting, Grafting and Gardening (it's so only for cheapness of the Book) let them read the Book of *S. Hartlib*, *John Evelyn*, *John Rea*, and *Leonard Meager* his *English* Gardener; which last I do chiefly commend to the lovers of Gardening, *&c.*

A

A Brief Description of the Honey-Bee.

THe Honey-Bee has two Horns growing out of her forehead, which ſhe can put forth at length, or draw in cloſe to her head, which ſerves for the ſence of feeling. *Bees Horns.*

Bees Eyes are her two Cheeks, which ſhine like a Lanthorn at the door; ſhe wipeth her Glazen Eyes with her Fore-feet before ſhe goes abroad; and if ſhe comes home laden a little before night and miſs the door at firſt, ſhe may go nigh to lye abroad all night. *Bees Eyes.*

Her Fangs are ſomewhat like a pair of Pincers, that open ſidewaysagainſt her Tongue, by which ſhe gathers her proviſion; her Tongue is of that length, that ſhe can double it under her Throat, with which ſhe can reach deep into Flowers: There are four other parts belonging to her Tongue, which ſerve as a Caſe for it. *Her Fangs.*

Her Wings are four, which carry her, until they are worn out. For the Bees of the former year dye about the latter part of Summer this year, falling dead before the Hives laden: So that a Bee is but a years Bird, with ſome advantage; which is a long life, in compariſon of the Silk-worm, which lives but 4 months, or the Waſp which lives but 5, or the Drone which lives but 6 months, as writeth that great Bee-maſter *Charles Butler*. *Her Wings.*

She has 6 Feet, ſhe ſtandeth faſt on 4, and with the other 2 conveys her gathering of her Fangs, both Bee-bread and Wax. The Bee-bread ſhe lays in dry Cells, for the young Bees to feed on,

and eat of it themſelves, (to ſave the Honey) being long kept it corrupteth.

Honey gathered. Honey they gather with their Tongues, whence they let it down into their Bottles, like a Bladder; each of them will hold a drop, which they empty into their Cells, and when full, they cloſe it up with Wax.

Drone Bees. The Drone Bees have no Sting, they live on the labours of others, and are all kill'd or die before *September* yearly, but moſt commonly ſoon after the Bees have done ſwarming; leaving ſeed for another year, ſomewhat like that which Butterflies leave on Cabbidge-leaves, as big as Pins-heads, and in *February* ſome of the ſeed begins to turn into Worms or Grubs, the outſide of the Grub dies, and the Bee is within it. If you kill the Drones before *Midſummer* the ſtock will not ſwarm, nor will the young Bees come to perfection (for want of the heat of the Drones) to eat the Bee-bread, by which means the Bee-bread becomes ſtinking, and breeds filth, and cauſes the ſtock to die.

Many Drones going with a Swarm is a good ſign. In *July* the Bees kill their Drones, having done breeding, but if they neglect it till the latter end of *Auguſt*, it is a ſign the ſtock is poor.

Queen Bee. The Queen Bee (ſo called) is longer than a Drone Bee, and longer winged, but not ſo thick; her Sting is half as long as the Honey-Bees: She leadeth the Swarm forth; if two Swarms are Hiv'd together, the Bees commonly fight till one Queen Bee is kill'd, which ſometimes may be found dead under the Hive that night.

I con-

I conclude with a few Obſervations.

1. Set your ſtocks on ſingle Stools here and there in your Orchard, ſo as each have the Sunſhine (ſomewhat) all the forenoon.

2. Let not weeds grow higher than the Bee-ſtools.

3. In *February* cleanſe your Bee-ſtools, new clay the edges, and lay Wood-aſhes on the crown of each Hive, and then begin to feed the poor ones with Sugar diſſolved in Water put in an Eldern Trough; continue this till they can live abroad, or feed them not at all.

4. Lay a bunch of Nettles under ſuch Stools where you ſee that the Bees are for lying under it.

5. In a plentiful year of Honey, ſmother the beſt Stocks, becauſe their Combs being full of Honey, they may want places to breed in, ſo may decay; and in every year take up ſuch as did not kill their Drones betimes. But in wet hungry years, you may find thouſands drowned in the Wort in Brew-houſes in great Towns; then keep the beſt alive. Thoſe that have many Stocks, commonly kill the beſt and the worſt, ſaving the indifferent alive.

6. Thoſe Stocks that have not Swarmed before the 20th of *June*, turn them upſide down, and fix dreſt Hives on them (*viz.*) mouth to mouth; clay the edges together, leaving a door, and ſmother both the Bees in the old and new Hive about the beginning of *Auguſt*, ſo will the new Hive have Virgins Honey; but if you deſire Stock-Honey, only raiſe the Stock on the 20th of *June* with Bricks, or the like.

7. As ſoon as you have ſmothered Bees in *Auguſt*, ſhut up the doors of thoſe Stocks (that you would keep alive) ſo as but two Bees may paſs out of each Hive at a time, that they may defend

themſelves from Robben Bees: Letting them continue ſo until the firſt of *February*, about which time make the paſſage wider and wider, that they may have juſt room enough to paſs in laden without hinderance, and no more. Remembring alſo to ſtreighten the doors always when Robben Bees are about them.

Receipts in Phyſick.

THeſe Receipts following have been tryed with good ſucceſs: for brevity ſake I ſhall omit thoſe many Cures, which (through Gods bleſſing) have been effected by them; therefore you may confide in them, although at firſt tryal ſome of them may not anſwer your expectation, yet be not diſcouraged, for perhaps at the ſecond tryal they may effect your deſire. My deſign hereby is to prevent your committing both purſe and perſon to the avarice and mercy of the Doctors, ſome of which perhaps know leſs the Cauſe and Cure of your diſtempers than your ſelves. And why may not *Man*, who is endued with a Rational Soul, know better the Cauſe and Cure of Diſeaſes incident to himſelf, than the brute Beaſts, who are endued with this knowledge only by inſtinct, or natural inclination; as the Stork, when ſhe has eaten a Snake, cures herſelf by eating *Originum*, or Wild Marjorum: Likewiſe the Tortoiſe, when hunted by the Adder, is ſaid to fortifie himſelf by the ſame Herb *Originum*: It is alſo reported that when the Weazle goes to fight with any poyſonous Creature, it firſt eats Rue; whence men came to know that *Originum* and *Rue* are good Antidotes

against

against poison: So in other Animals there is an i n bred skill and Medicinal Art; as when the Lion is sick, 'tis said he is recovered by eating an Ape: It is also related that when the Toad is wounded, she will go to Sage or Rue, and rub the wound, and so escapes the danger. We are told the Pye, when sick, puts a Bay-leaf in her nest, and recovers; so Crows, Daws, Black-birds, Cranes and Partridges, purge their sick Stomachs with the same. The Swallow first taught us that Celandine is Medicinal for the Eyes, being the same wherewith they cure the Eyes of their young ones: The Lapwing being surfeited, cures herself with Southern wood: Swine when stung by a Snake, eat the Snake and are well: The wounded Hart eats Bitany; and Dogs, when wounded, cure themselves by continual licking of the wound; also they purge their stomachs, when over-charged, by eating of Grass; as Cats do theirs by eating of Nip, called also Catmint.

Some Receipts in Physick and Chyrurgery.

I Have placed the Receipts in an Alphabetical order, and for brevities sake, made use of the Apothecaries weights.

1. A Corn of Barly, Wheat, or Pepper, may be used to weigh a Grain weight in Medicine, which is known by this mark Gr.

2. Twenty of such Grains make one Scruple, marked ℈j.

3. Three Scruples, that is, 60 Grains, make one Dram, known by this mark ʒj, thus ʒij Drams.

9 *d.* in Money may serve to weigh ʒj.

5. Eight Drams make an Ounce, thus marked ℥j.

6. Six-

6. Sixteen Ounces make one Pound, marked thus 1 ℔.

℞ the mark for Take.

Agues.

℞ *Carduus Benedictus*, boil it in Posset-drink, and sweeten it with Treacle; drink it, being warm in bed, a little before the fit is expected. Observe the same before every Fever fit.

A Drink to take as often as you are Thirsty. ℞ a quart of Barly-water made scalding hot, put to it Sena ℥j, Liquorice and Anniseeds, of each ℥ij, in powder, let it stand covered half an hour before you drink any. This may serve to drive away the Ague Cake (so called.)

Many have been cured of Agues with Jesuits Powder, (which is only the Bark of a Tree) about 2 *s.* the ounce; some take it made into Pills with Conserve of Roses, or the like, about seven Pills every four hours for the space of about 40 hours; this way taken it is very binding; a strong man may take an ounce together in half a Pint of Sack, as soon as the Ague fit is over: and is not so binding, but has a Cure at first, second or third time of taking; and fails not of dissolving the Ague Cake, so called, as I am credibly informed.

Burns and Scalds.

Boyl Elder-leaves, Water Betony and Mullein in fresh Butter till the Herbs be crisp, strain it for an Oyntment: Or dip a double cloath in the juice of new Horse-dung, apply it with speed, it gets out the fire, and heals.

Baldness.

Anoint with Honey, or Eels fat, or Boars grease.

Balsom.

℞ the best Sallat Oil one quart, yellow Wax half ℔, *Venice* Turpentine ℥iij, Liquid Storax ℥vj, Oyl of St. Johns wort ℥ and half, Red Sanders, Dragons Blood, Mumia, of each ℥vj, Rosemary Bays,

Bays and Sweet Marjorum, of each a handful; put the Herbs, Dragons Blood, Wax and Mumia into a Pipkin together, and set them on a slow fire, and let them boil leisurely, then take the oil Turpentine and oil of St. Johns-wort, with Plantane and Rose-water of each one pint, and Conduit water one quart, and put them into another Pipkin, and set them on a slow fire, to boil a quarter of an hour: Then put them all together, and let them boil a minute, and take it off the fire, and put to it Natural Balsom ℥ and half, and the Red Sanders, and boil it a minute and strain it, when it's cold pour out the water and melt it, and put it in a pot. This is of great use for several things hereafter specified.

Bleeding at the Nose.

Roll Rabbets wool in Dragons blood and Bole Armoniack, and stuff it into the Nostrils.

Bleeding of a Wound or Cut.

Lay on a Spiders web: Or dip a Feather in hot Balsom and lay it on, and bind up the wound, and unbind it not till 24 hours after.

Bound in the Body.

℞ ʒ and half of Holland Powder. See *Costiveness*.

Biting of a Mad Dog.

Eat the fry'd Liver of the same Dog: Or apply a Pickled Herring: Or the Clearing Oyntment scalding hot. See *Biting of Venemous Serpents.*

Back to strengthen.

Anoint with the Green Ointment, and lay on a Plaister of soft red Sealing Wax, or Lead Plaister.

Bloody Flux.

℞ Red Oak bark ʒij, Cinnamon ℥j, and some Cloves, being in powder, put some in a Pancake; or some into a little bag of dry wheat floor, and boil it with other meat for two hours, eat what you can of it.

Bruises.

Bruises.

Fry Cow-dung and Hogs-lard together, and lay it on every night: Or Mallows and Chickweed put in a pultice; or Hysop and Green Wormwood beaten together; or Lead plaister.

Bruises inward, by falls, &c.

Boil a sprig of Rosemary and half a Nutmeg in a pint of Ale, strain it, put to the Liquor Treacle, Mithridate and Diascordium, of each half a pennyworth, drink it, and sweat in Bed, and lay on the place either a plaister of Red Sealing Wax, or the Lead Plaister, or take the Balsom in Pills.

Boyls to break.

A Plaister made of Honey and Wheat flower.

Blood to cleanse.

Water Cress pottage in the spring of the year, and put in a good quantity of Ceaver-grass in all your broath. See the *Clearing Drink.*

Barly-water.

Boil two spoonfuls of *French* Barley in one quart of fair water, a minute.

Consumptions.

℞ Raisons of the Sun stoned ℥iij, White Sugar Candy ℥ij, Old Conserve of Roses ℥iiij, Elecompane Roots in powder ʒj, Oil of Sulphur 6 drops, Oil of Vitriol 3 drops, beat them together, take about the quantity of a Nutmeg morning and night. This is good for a Cough also. Or Tar Pills thus made: ℞ Annis, Carraway Fennel seed and Liquorice, of each a like quantity, being made into fine powder, make them into Pills with the best new Tar; take as much as two Pease morning and night till well; Rice milk is good also: Pease pottage, boil'd Coleworts, Turnips, Eggs well drest; follow the Plow sometimes.

Another for a Consumption.

Take a Leg of Beef, wash it and break the bones to pieces, boyl it in six Quarts of Spring or River water about six hours, then put to it 4 Calves feet the

the bones broken, Raisons in the sun stoned 1 ℔, Liquoris ℥ij sliced, some Dates stoned, and Harts-horn, and a little French Barley, Burage, and sweet Marjorum, then let it simmer about 6 hours more, strain it and keep it in a pot uncovered, it will keep 3 or 4 days in Summer; drink about half a pint warm in the morning, as much at 4 in the afternoon; if the stomach will not bear so much take less at a time and oftner upon an empty stomach, if you think it too sweet, put some of the Juice of a Lemon or Orange to each draught.

For a Consumption Cough.

℞ 3 Spoonfuls of the Juice of Liverwort, and 6 Spoonfuls of the strokings of a red Cow, and two Spoonfuls of white Sugar, with fine Wheat Flower make 12 Cakes, bake them, eat one every morning fasting, and an hour after drink a glass of Muskedine and walk after it. Then take a quart of the Juice of stinging Nettles, boil it and skin it, when it's cold put to it one quart of Muskedine, the Yolks of 6 Eggs new laid, and half a pound of loaf Sugar, and stir them together and put it in bottels in some cool place till the Cakes are spent, and drink every morning half a pint fasting, and eat not till an hour after; if you find good by it, take as much more: Hysop, and Succory water sweetned with Syrup is good at nights.

Canker in the Mouth.

Mix Honey, Alom and Vinegar together, with which wash the Mouth often. See *Mouth Sore.*

Cleansing Ointment.

℞ Hog-seeme and Turpentine, of each ℥iiij, Bees-wax, Rozen and Verdegreise of each one penny worth, boil it together till it's pritty thick, put it in a pot for use; good to cleanse and heal the Kings-Evil or other Sores; If there be a hole, warm some of the Oyntment in a spoon and dip a Tent therein, If no hole in the sore, dip in Lint and lay it on, and cover it with the Lead Plaister; wash

it

it once in 24 hours with milk, or the drying water, if it's much swelled, see *Swelling*, and use the Poultice there over the Plaister: when you think it is sufficiently drawn make some more Oyntment, and put in but little Turpentine, and no Verdegreise except some dead flesh remain, and heal it with the *Melilot*, or Lead Plaister.

Coughs, or Colds.

Boil Sage in Ale and drink it at going to bed, or boil a sprig of Rosemary and 3 sliced Pippins in a pint of Milk, drink the Whey: Or a roasted Pippin well buttered: Or Hysop and Penny-royal water and Sugar. Or Oyl and Sugar. See *Consumptions* and *Hoarseness*, Or Butter and Honey mixt, or Hysop water at night.

Chops.

Anoint with Goose or Capons grease.

Chollick, or Wind-Chollick.

If bound in the body take Holland-powder ℥i, See *Stone* and *Wind*.

Cholar to purge.

℞ Rubarb ℥i, Gingar ℈i in the Morning in broth.

Cramp.

Rub the Knee bone of a Hare between your toes every night and smell to it, use the green Ointment.

Corns on the Feet.

See *Sweaty Feat.*

Chilblains on the Feet.

Hold the Itching place about a quarter of an hour to the fire with your Hose on, do so every time it itches. If they break, see *Kibes*.

Costiveness.

Put the Herb Mercury in your broth.

Deafness.

Get some body to drop into your Ears, a little of the Oil of bitter Almonds, or the Fat of a silver Eel (so called) if this doth you any good, get them

get them well syringed with Beer and warm water at going to bed, if this doth not cure you, snuff into your Nostrils the juice of Ground-joy, with this last I have help'd some.

Dimness of the Eyes.

Wash your Eyelids with your own warm Urin morning and night.

Rheum in the Eyes.

Beat the white of an Egg with a little honey and lay it on Flax, and apply it to the Eye or Eyes going to bed, if but one Eye sore, then lay a drawing plaister, as Burgundy pitch to the contrary wrist, if both Eyes then to both the wrists, and another behind on the neck, upon the round bone, and also lay on Temple patches every morning fresh, made of Leather and spread with Tar.

Black Bruises about the Eyes by Falls, &c.

Beat green Hysop and wormwood together, and lay it all over the Eyes every night till well.

Pearl or Webb in the Eye.

℞ the yolk out of a Hens Egg and put in its place the juice of Housleek, set the shell on hot coals till half the juice is wasted, dip a small feather in this water, and put a drop against the Pearl twice a day till well, Or do so with the distilled water of the herbs called Mouse-ear, Half-moon-grass and Eyebright, when any water is too sharp for the Eye you may put a little white Rose-water to it; Some people dissolve white Coperas in white Rose-water to eat off a thick Webb that covers the Eye.

Drying water, to heal and dry up Sores.

℞ Camphire half ℥, white Coperis ℥j, Bole Armoniack prepared ℥ij, being in powder keep them in a Glass together for use, when you use it, put 2 spoonfuls into a quart of Scalding water, stir it well, and with a rag wash the Sore therewith twice a-day, dip a cloth double therein and and lay it to the Sore.

To prepare the Bole, Beat it ſmall and waſh out the Droſs and dry it in the Sun.

The Second water.

℞ 1 Quart of the water, wherein a Smith has quenched Iron often, and boil Plantine and Marigold leaves therein, of each a handful, ſtrain it and add four ſpoonfuls of Vinegar and two of burnt Alom.

Drying Ointment.

℞ Water betony, ground Ivy, Mallows, Plantane, and the inner peeling or bark of Elder branches, of each 1 handful, cut and bruiſe them, and boil them in 1 ℔ of tryed Mutton ſuet till the herbs are criſp, ſtrain it, and put to it of Musk 3 grains.

This Ointment is a quick dryer up of Scabs and other Sores; But for burns and ſcalds, (if the juice of new horſe dung doth not cure) melt ſome of this Ointment with a little Bees wax and Sallet Oil, But for ſudden and hot ſwellings melt ſome with Oil of Roſes.

Dropſie.

℞ Jalop, Sena and Cream of Tartar, of each ʒj. being in Powder, take ʒj thereof in broth every morning for 20 days: Or ℞ of the powder of the roots of Danewort ʒj.

Fainting.

Eat Conſerve of Motherwort, or Balm, or Burrage Flowers.

Feavers.

℞ the ſame for a ſweat as is ſhewed of *Agues* (before going) there is nothing better in the beginning of moſt diſeaſes; For cooling ſee the *Julip*: To cauſe ſpitting ſee Syrup of *Vinegar*: If the Mouth is ſore, ſee *Mouth ſore*: If too much bound in the Body, ſee *Coſtiveneſs*: but take care that you get not a Flux for that is dangerous. In a Feaver Perry is cooling; And the drink made of Bramble berries is Cordial, how to make it See Gooſeberry Wine and Cyder.

Flux.

℞ the Powder of Tormentil Roots, with Sugar and the white of an Egg, make little Cakes and bake them on a Tyle by the fire, eat of them according to your need: Or burn the Marrow bone of an Ox, and take as much of the powder 3 times a day, in dish meat, as will lye on a *6d*; Or ℞ as much as will lye upon a *6d.* of Gauls, such as is put in Ink, in powder, but take heed that you take not too much, lest it bind too fast; Fluxes oftentimes proceed from Choler in the Stomach, for which take Rubarb ℥j in powder well dryed over a Cheffing-dish of Coals. See *Choller to purge.*

Flegm.

℞ Powder of Centory every morning, or Syrup of Vinegar sometimes.

Fundament fallen out.

Anoint with Oil of Roses, or the green Ointment, force it into its place after every stool; be not too much bound in body.

Gooseberry Wine.

℞ Mellow Gooseberries and stamp them, and to every three measures of them, put two of cold water, put them into a Mash-tub (as for brewing of Beer) let them soak together about 7 days, then draw it into a Barrel, and to every Gallon of the Liquor put 2 ℔ of Brown Sugar; when it will run clear draw it into Bottles, and put a lump of good Sugar into each Bottle; the more you put in the stronger it will be, and keep the longer; thus you may make wine of Bramble-berries, (a good Cordial,) or other fruit.

Gauled the Skin of the Leg.

Lay the Lead Plaister on the sore, if it be on the hands, or between the Childrens legs cast Ceruse on it, or the dust of rotten wood: If by riding, drop tallow from a Candle into beer, and anoint with it; to prevent gauling when you ride, lay next your skin the Fur side of any skin with the Fur on.

Gangreen.

Use the cleansing Ointment hot, if it be very dangerous, hold the place in a pail of warm milk, and apply the Lights of a new kill'd Calf, and as one changeth colour lay on another. See *Venemous Bitings*.

Green Ointment.

℞ Sage, Rue, Bayleaves, Wormwood, Mallows, Camomil, Dill and Adders-tongue, of each one handful, shred them, take the weight of all the Herbs of Sheeps suet, first beat the Herbs in a stone or wooden Mortar very well, then put in the shred suet and beat them together, then boil them with 5 pints of the best Sallet Oil on a slow fire, stirring them till the herbs be crisp, and the Ointment look green; then strain it, and stir into it while it is hot ℥iiij of Oil of Spike. This must be made in *May*. When you know all its vertues, you will prize it as a Jewel.

Note, That when you make Ointments, have always ready a thick cloath or tin cover to cover it, lest the flame should catch your work.

Gout.

If it be the Wind-Gout, follow the medicines to expel Wind, constantly. See *Wind*. If it be the Rich Gout (so called) nothing better than to keep in a warm bed in time of extremity. If you use an Ointment take this. Boil Frogs in water till their flesh come off the bone, when the Liquor's cold use the Oil.

Green sickness.

℞ Long Pepper, Liquorice, Annis and sweet Fennel-seeds, of each half ℥, Commin-seed a spoonful, Steel Powder 2 penny worth (for short windedness only leave out the steel powder) make them into powder and add ℥iiij of Sugar, eat as much as will lye on a 6d. dry, morning and night, and walk after it.

Gri-ping

Griping in the Belly without Looseness.

℞ 3 pints of new Milk, put to it ℥j of whole Pepper rubbed from the loose scales, boil it till 1 pint is wasted, drink the milk, see *Wind*.

Head-Ach.

Drink Tea thus made, ℞ Sage, Penny-royal and Mints (that was gathered in *May* or *June*) boil them in fair water a minute, and let it stand covered a little, drink it warm with Sugar: Or boil Camomil and Penny-royal in water till it's tender, lay it to the pain at going to bed; if you are not of a very dry constitution, use Mustard with your meat often, or thus made. ℞ Mustard-seed ℥ij, Cinamon half ℥, beat them to powder and make Cakes thereof with Honey or Sugar, and Vinegar, and dry them in the Sun, when you use it, dissolve it in Vinegar, eat Rosemary with bread and butter.

Heart-burning.

Scrape a little Chalk into fair water and drink it, or skimmed milk; or the Julip.

Help Digestion.

℞ ℥j of the powder of Centory every morning, or ℞ the *Clearing Drink*.

Hoarseness.

Boil Liquorice, Maiden-hair, Figs and Fennel-seed in fair water, take a Spoonful often. See *Coughs*.

Dr. Hollands *Powder.*

℞ the seeds of Annis, Caraway, Fennel, Cumin, Spicknard, Cinnamon, Galanga, of each half ℥; Liquorice and Gromwel-seed of each ℥j, S-na the weight of them all, being all in fine powder put them in a glass close stopt near the fire: This is good for the Wind-Cholick, or Stoppages of either Guts or Kidneys, Dose ℥j in some syrup, give weak men and children less.

Imposthume in the Throat.

Swallow 30 Bird-shot, for a Child 20, use that mentioned of *Throat Sore*.

Julip to cool the Stomach in Fevers, &c.

See *Barley-water*, to which add ℥ or ℥iij of the Syrup of Violets, and half ℥ of the Spirit of Salt, take a spoonful every quarter of an hour, till the heat of the stomach is allayed.

Jaundice.

℞ Rubarb, Tirmeriack and Cream of Tartar, of each ℥j, Saffron gr. *6.* being in powder together take ℥j in broath every morning till well.

Itch.

Boil Housleek, Mallow, Scabious, Plantane, Beets, Violet and Dock-leaves, Elder and Brier-leaves, Barefoot, Fumitory and Elecompane, of each a handful, in water, and some Vinegar, wash some of the forest places therewith, having for 3 or 4 mornings before drunk brimstone and milk.

Itching of any place.

Wet the place often with Vitriol water; or fasting Spittle mixt with burnt Alom.

Kibes.

One Plaister of Burgundy pitch commonly cures, if you do not bruise the place with your Shoes: Or the *Lead-Plaister*; Or a dry Oak-leaf when it's almost well.

Kings-Evil.

See the *Cleansing Ointment*, take the *Wound Drink*.

I am credibly informed that a woman cured her Daughter of the *Kings-Evil*, some of her Fingers being almost eaten off with the humor, only by the Herb Pilewort gathered in its prime about the beginning of *March*; the distilled water of the Roots, Leaves and Flowers she gave her to drink often, and used it very hot to wash the sores, and did anoint the swelling with this, to 2 ℔ of the whole Herb and Roots, she beat 1 ℔ of Hogs-seeme, and let it stand in the Sun about 2 weeks, then boiled it till the Herb was crisp; and for a Plaister for the same sores, she melted into the Ointment, of Rozen

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a quarter of a pound, Bees-wax half a pound, and Turpentine three ounces, or near thereabouts.

A Diet Drink for the Kings-Evil, or other dangerous Sores, and fulness of Humors, which (by the blessing of God) hath done great cures, where great Doctors (so accounted) have failed in London, *and other places.*

Take Sweet Fennel-seed, Yellow-Dock roots, Hermodactils and Sena of each three Ounces, Sarsaparilla and Polypody roots of each 4 Ounces, Egremony and Scabius dry, of each one pound, Nutmegs, Mace and Cinnamon of each an Ounce, beat the seeds and spices very small, and bruise the Roots and Herbs, and put them into a Canvas bag, and put the bag into a Vessel of 4 or 5 Gallons of Strong Ale; before it has done working, let the Bag hang in the middle of the Vessel, at 4 days end drink a draught in a morning, another at 4 a clock in the afternoon, and also at going to bed; continue this course till you are well, if you make this in hot weather, draw it into bottles before it inclines to Sowrness; you need not keep house, it is most effectual in *April* and *September*; Omit not the taking of it in those two months, tho you may be seemingly well.

A Plaister for the Evil-sore.

Take best Sallet Oil, and fine shifted white Lead of each a like weight, put them in a deep penny black pot, and boil it leisurely for 5 or 6 hours, till it rope and look of a dark colour, continually stirring it with a stick, then pour it into water, and with oily hands, make it into Rolls, and it will keep good many years; it is good for Kibes, and seveal other Sores to dry.

Melancholy.

Proceeds from gross humours gotten into the Brain; ℞ Sena and Cream of Tartar of each ℥j, Cinnamon

Cinnamon half ℈, make them into Pills with the Syrup of Balm, or Clove-gilly-flowers, take half ʒ an hour before supper.

Lead Plaister.

℞ 5 ℔ of red Lead, search 3 ℔ thereof through a fine Tiffeny, boil it on a slow fire with 2 quarts of the best Sallet Oil, stirring it till it change its colour, or thick enough to make into Rolls with oily hands, or make searchers. It is good for Aches, *&c.*

Melilot Plaister.

℞ Melilot, Pimpernel and Scabious of each 2 handfuls, beat them small, then beat them in a Mortar with 2 ℔ of tryed Hogs-lard, let it stand in the Sun about a week, then melt it, and strain it, and add as many more Herbs, and set it in the Sun again and melt it again and strain it, and boil it until the Juice is wasted, take it off the fire, and add Rozen, Bees-wax and Venice Turpentine of each alike, so much as will make it stiff enough to make it into Rolls, which you may know by dropping some of it upon a board; this is an excellent salve for healing of sores, add 5 gr. of musk to perfume it.

Mother fits.

℞ Cyprus Turpentine ℥j, Red Amber ʒj, Rubarb ℈ij, make them into Pills, ℞ ʒj going to bed, and hang Assafœtida about the neck.

Mouth Sore.

℞ Orpin, Colenbine, Sage and Violet-Leaves, boil them in water, strain it, add Honey and Alom, rub the mouth with a Rag tipt therein. See *Fevers*, *Teeth-ach* and *Canker*.

Mouth sore in Children, by being bound in their bodies.

Rub their gums with Honey of Roses, thus made, ℞ some buds of red Roses, put them in a Glass with Honey and set it in the Sun; give them the *Manna Purge*; Loaf Sugar often heals a sore mouth.

Manna-Purge.

Diſſolve ℥j of the whiteſt Manna in warm milk, ſtrain it, and give it to a Child to drink in the morning.

Dr. Mathews *Drink for all Diſeaſes.*

℞ of the beſt white Rheniſh Tartar and India Salt-Peter of each 1 ℔, beat them into fine powder, and ſearch it through a hair Seive, take a Pipkin that was never uſed, and ſet it upon Charcoal, let the bottom heat as the Coals kindle, put in a ſpoonful of this powder; if the bottom be red hot it will burn; put in one ſpoonful after another till all be burned, it is then for this work prepared, and if thou haſt wrought well, thou wilt have a white Salt (but yellowiſh) ſeventeen ounces again of thy 2 ℔. ℞ half a buſhel of white Lime, put it in a clean Tub, and put on it fair water, that the water may cover it 4 inches, let it ſtand all night; take two Gallons of this water, and put in it thy Salt, and it is prepared for thy work; then take red Poppy leaves (called Corn Roſes) newly gathered, Juniper-berries and black Hellebore roots of each 1 ℔ groſly beaten, put them in the prepared water, into a glaſs body, or tin, or pewter Veſſel covered cloſe, ſo let it ſtand upon hot Coals 24 hours (or longer if you do not keep fire all night) then drive the Liquor through a Hypocris bag (that is a Flannel bag) and put it in bottles having made it clear: Drink of this 3 or 4 ſpoonfuls in White Wine and Sugar, give more or leſs as the Patient is weak or ſtong; to weak Children half a ſpoonful with Sugar. He ſaith this will cure thee let thy ails be what they will —— if with a quiet mind pray and uſe this, and therein reſt waiting upon God, *&c.* The Book from whence I tranſcribed this Receipt, he dedicated to all that fear the Lord in truth and uprightneſs, but to thoſe eſpecially (of them) as are poor and have no money.

Oil

Oil of Roses.

Is commonly made by putting Red Rose leaves with Sallet Oil in a glass, and set it in the Sun, *&c.*

A Purge.

This Purge is safe for all who need Purging. ℞ Rubarb, Sena, and Liquoric, of each ʒj, Jalop ℈j, Cream of Tartar, Anniseeds and Ginger of each half ʒ; beat them into gross powder then add the Tartar, and put them into a pot to half a pint of Whitewine (or water) cover it, and let it stand on hot coals all night; in the morning strain it, and drink the Liquor. If you are apt to vomit, hold a toasted piece of Bread to your nose: Keep house that day, and take Posset-drink after every stool. An Apothecary will sell you one of the Purges (without Wine) for 4 *d.* Proportion it for the younger.

Purging Syrup of Roses.

℞ Damask Rose leaves 1 ℔, Water a quart, let them stand covered in a pot all night by the fire, then strain it, and add as many more Roses to the Liquor, and set it by the fire as before, do so 4 or 5 times if you would have it strong to purge, lastly boil it with its weight in sugar to a Syrup: By this rule you may make other Syrups, *&c.* Dose 2 spoonfuls.

Pills, how to make them.

℞ Aloes, Cicatrine ℥ij, Rubarb ℥j, Sena ℥j and half, Mastic, Agrick, Myron, dryed Marjorum, Cream of Tartar, Aniseeds, and salt of Wormwood of each ʒj, Ginger ℈j, being all made into fine powder, make them into paste (with Syrup of Roses or Clove-gilliflowers) with oil'd hands and put it in a pot, Dose from ℈j to half ʒ at going to bed, These are Pills to be taken often by such as have surfeits, or have had hurts or Bruises, whereby the use of their limbs is impaired, and must be taken often, because hurts in remote

mote parts of the Body cannot be taken away at a time, it will not hinder your following your Business, if you do not take too much at a time.

Pills of Ruffus.

Called also pestilential Pills, as being a good preservative in pestilential time, cleansing the Body of such humours as might be apt to take the infection, the body being freed from excrements by the Aloes, from putrefaction by the Myrrhe; and by Saffron the vital faculties are quickned, they strengthen the Head, Stomach and Heart, cause Digestion, and a good Appetite, provoke the terms, cure surfeits Dose from half ʒ to ʒj. They are thus made; ℞ best Aloes ℥ij, choice Myrrh ℥j, Saffron half ℥ with the Syrup of Wormwood or other good Syrup make them into paste, to put in a Galley pot, when you happen to make any pills to Liquid, you may stiffen them with the powder of Liquoris.

Plague sore to break.

Make a hole in a long Onion, and put some Treacle therein, roast it in the Embers, spread it on a Cloth and apply it; In the time of the plague ℞ every morning a small clove of Garlick, 20 small leaves of Rue, a Fig, a Wallnut Kernel, and a little salt, beat them together and eat it; for your ordinary drink all the time of the plague, boil Scabious and Cardus in water, But above all (next to the Fear of God,) take the *Wound drink*, to clear the blood, so will not the infection meet with a humor so soon,

Pox small.

At the beginning of this disease, heat-spots or pimples arise on the Face, be not let blood, for that often brings death, but for more safety go not abroad but to bed, and take the following sweat (which will not be amiss let your distemper be what it will) ℞ one quart of new milk, boil 4 *d.* worth of Saffron (tyed in a rag) therein, about a quar-

a quarter of an hour, sweeten it with Honey and drink it; to keep the Pox out of the Eyes let the rag of Saffron lye in milk and wet the Eyes often therewith, and put a stay under the throat rubbed with saffron; pick not the scabs off your Face, but anoint them often with Deers suet, or oil of Roses mixt with Cream of Tartar, to prevent pitting, and drink the same drink (as often as you need) which is mentioned before. See *Plague*.

Poison newly taken.

Drink sallet oil; or the oil mixt with cream of Tartar, and force your self to vomit, or at least take Garlick boil'd in milk sweetned with honey. Or, gr. 10 of Unicorns horn in sallet oil.

Pains outward that come suddenly.

Wet the place with brandy, or the green ointment: or heat a piece of a Tyle, and put it in paper and lay it to the pain.

Pallet of the Mouth down.

Lay Pepper on your Thumbs and crush it into its place, and lay Featherfew on the Crown of your Head. See *Throat sore*.

Piles

That are painful are caused by melancholy blood gotten into the veins of the Fundament, which makes them swell, when they bleed ease comes; those that have them and bleed two or 3 times in a year are healthful and need take no Physick; If the pain be great, sit over the fume of Rest-harrow and Mullein boil'd in water, anoint with the ointment made by boiling of Pilewort roots in fresh butter or oil of Roses, or the fat of an Eel or Trout: Eat bread and Butter often, and chew all your meat well; take nothing that is salt or binds, or hath Aloes in it, if too much bound take the Manna purge: sit not on a Cushon, keep the feet warm.

Pleurisie.

If the left side be hard and swell'd, lay on what I have mentioned in that of the Spleen. See *Spleen*.

To

To cause spitting take the Syrup of Vinegar: See *Agues*, for a sweat: Or take ℥j of the powder of the yard of a Stag or Bull, or Goats blood, or juice of Succory; if you find no ease in taking of these for two days, let blood in the Arm. If you stay 4 or 5 days before you be let blood, it is dangerous, if not death to bleed.

Rickets.

℞ Camomil three quarters of a peck, Black Snails half a peck, *May*-dew a quart; put them in a pot, and bake them with Town-bread; with the oyl that swims on the top anoint the Childs Elbows, Wrists, Knees, Ankles, Joynts and Back-bone, by the fire, stroaking downwards with your hands: Dip Rags in the same, and tye them about his Joynts, and a long piece for his Back, rolling it close: Or fill a penny Black pot with Camomil, put in 2 penny worth of Mace, and almost fill up the pot with Sallet Oil, and bake it: And give the Child every morning the milk wherein 6 house-snails was very well boil'd; Or as much as will lye upon a 6d. of the Powder of young Rooks Liver 3 times a day in marrow broath.

Another.

℞ a quart of Muskedine, and so much marrow as you can get in 5 or 6 Beef marrow bones, with 2 sprigs of Rosemary, boil them, with which anoint the Childs joynts, back and breast twice a day by the Fire till well: Or ℞ a pint of Muskedine, boil in it half ℥ of hartshorn, let the child drink some, and anoint the back bone with the same, this last, or the next may serve at the beginning; ℞ Isinglass, and boil it in milk and give it inwardly, and also anoint with it.

Ringworm.

See *Anthonies Fire* and *Shingles*.

Ruptures.

Bruise the Root of Solomans Seal, and apply

is under the Truss; or Comphrey-roots, or Knot-grass.

Sores.

See the *Cleansing Ointment.*

Scabs on the Head.

Boil the young green leaves of Fox-gloves with fresh Butter to an Ointment: ℞ *Manna Purge.*

Scabs on the Face.

Wet them often with the *Vitroil Water.*

Scald Head.

Roast a fat Breast of Mutton warm from the Sheep, put Tar thereon, and sprinkle it as it roasts with soot that comes of the Wood of burnt Ash: with the Dripping anoint the head twice a day, and by little and little get the hair up by the roots. ℞ the Manna Purge every day.

Swelling that riseth on a sudden.

Boil Camomil, Smallage and Mallows in Milk to a Poultice, put to it a little Suet, lay it on every Night, it commonly dissolves a Swelling without breaking, apply it also over all great Swellings, after the Plaisters are on, or use the Drying Ointment.

This following has dissolved many Swellings in the Joynts. ℞ the best Aquæ-vitæ and Sallet-oil, of each about 2 or 3 spoonfuls, beat them together with a Spoon in an Earthen-Porringer about a quarter of an hour, with this bath the Joynt very well every night, with a warm hand against the fire, and then wet a brown Paper therein and lay it to the swelling.

Spitting or Pissing of Blood.

℞ Comfrey, Mints, Plantain, Bloodwort, Mallows, and Sorrilseed, boil it in Milk and drink it.

Short-windedness.

Eat 10 Juniper-berries every Morning. See *Green-sickness.*

Sleep to procure.

℞ Field-Poppy-leaves, Fresh and Red ℥iiij, boil them

them in a quart of Water till half is wasted, strain it, then boil it with its weight in Sugar, and ℥j of Liquoris, when it's thick enough to make it into Lozenges or Cakes, eat some going to bed. See *Dr. Matthews Drink*.

Syrup of Venegar.

℞ Honey 1 ℔, Spring water and Vinegar of each half a pint, boil it and skim it till it is as thick as a Syrup, take it off a Liquoris stick, it's good to cause spitting in Agues, Feavers, Spleen and Plurisie.

Swimming of the Head

Is caused of wind in the Head; ℞ a pint of *Aqua vitæ*, Rosemary shred 1 handful, sliced Nutmegs 2; let them steep together 24 hours; then wet 2 spoonfuls of Sugar in the Liquor, and swallow it down leisurely, morning and night, for 5 days together, and leave taking a week: Or Dill-seed taken often in dish meat is also good.

Scurvy.

℞ a pint of skim milk, turn it with the Juice of a Lemon, boil in the Whay a little Agrimony, Scurvy-grass, Betony and Wormwood, strain it, drink such a quantity 6 mornings together; ℞ the *Wound Drink*.

Sciatica, or Hip Gout.

℞ half a pint of *Aqua Vitæ*, Long Pepper beaten small half ℥, set them over a Chafing-dish (in a Platter) over Wood Coals; then with a hot hand rub the grieved place by the fire with this water, in which wet a brown paper double, and lay it on, and bind it on with Flannel; do thus every night for 10 nights together, and keep house, and take a Purge.

Sprain.

Anoint with the Green Oyntment: Or Nerve-oil: and apply the Lead Plaister: Or Red soft Sealing Wax.

Sweaty Feet.

Wear Socks of Brown paper, or Bladder; or a piece of an old Oil'd Hat-case, or Lead Plaister next the Soals of your Feet, which will cause Cornes and thick skin to come off the easier.

Sweating too much in Bed.

Mix the Pulp of 3 roasted Pippins with Water and Sugar, drink such a quantity for 3 nights together, if this doth not help you, take heed you are not going into a Consumption.

Shingles.

℞ the inner Bark of Elm boughs half ℥, Housleek 5 heads, Tobacco leaf the bigness of 1s. boil these in half a pint of Cream to an Oil, anoint with it: Or black Writing Ink.

Spleen.

To mollifie the hardness thereof, fry Oats with Brandy, put it in a bag, and lay it to the side; or apply the *Cleansing Ointment*, made stiff like a Plaister, leaving out the Verdegrease.

Stitches.

See *Pains outward.*

Sinews shrunk.

Anoint with Green Ointment, or Nerve-oil, or lay on the *Lead Plaister.*

Surfeit.

℞ Mint, Carduus, Poppy, Wormwood and Liverwort, of each a handful, boil them in Milk, drink a draught every morning: Wormwood-Ale is good also. Steep Fumitary in Whey, and drink a draught every morning.

Stone.

℞ the Kernels of Acorns, Hips and Haws, of each ℥j, Oil and Grumwel seed, of each ℥ij, Gingar half ʒ, beat them to powder; to ℥ij of the powder, add ℥iiij of Loaf-Sugar; take as much as will lye on 1s. in Wine or Beer every morning, give less to Children in black Cherry-water: Or take the Syrup of Camomil often, being in a sweat in

in Bed when the Pain is most: Or take Pills every night made of Butter and Honey, this last is good for a Cough.

Teeth hollow.

Stop them with burnt Alom and Bees-wax mixt.

Teeth-ach.

Mix Soap and Chalk together, and tye it in a rag the bigness of a Pease, and put it behind the Ear where it sweats most, or Melilot Plaister, or Burgundy-pitch; Or take a piece of a thick Glass-Bottle, heat it red hot and quench it in Vinegar and Pepper, hold some hot in the mouth often, and lay on Temple-patches of Gum-Caranna, and pare all the Nails.

Teeth to keep sound.

Rub them with Salt and water every morning, and wash them with fair water after every meal.

Teeth black.

Rub them with Tobacco Ashes, or the Ashes of Vine-leaves burnt; or a piece of a Dutch Earthen dish, or China dish beaten to powder, then wash them.

Teeth to breed easie.

Rub the Teeth with the Brains of a Hen, or let a Stoned Horse breath into the Childs mouth twice a day, which may prevent Convulsion-fits.

Thorn got into the Flesh.

Suck it often with your mouth.

Throat sore.

℞ the Powder of Orpin with Honey, or pick Sheeps wool very fine, and lay it on a piece of Flannel 3 fingers broad to reach from Ear to Ear, then spread the Wool all over with the green Ointment, or Ointment of March-mallows, then sprinkle upon it some of the Oil of Roses, and upon that the Dust of white Dogs-dung, apply it warm to the Throat.

Vitroil-Water.

Soak Vitroil in fair Water.

Venemous Serpents, or Adders biting.

Either presently cut the place off; or suck it very much; and then wash it with Urine, and apply the Cleansing Ointment scalding hot; or apply Wild Marjorum beaten with the Cream of Tartar, or lay on a Pickled Herring, but the best of all after the sucking it well, is to apply the bellies of live Pigeons. See *Gangreens.*

Vomiting to stay.

Take Mint-water, or Marmalade of Quinces.

Whitloes.

℞ Orpin, or Sorrel wrapt in Paper, and roasted in the Embers, and applyed hot.

Warts.

Wet them often with fasting spittle mixt with burnt Alom, But for a great wart you may lay on a Plaister of Red-wax with a hole in the milddle that the head of the wart may be seen, wet it often with spittle and burnt Vitroil or Coperas, or drop a little Brimstone from a flaming Match; Or Aquafortis, if this last make it smart, wash it off with speed.

Wens.

In the beginning, observe the same, as of *Warts*, and beat a piece of Lead like a Plaister and rub it well with Quick-silver and Fasting Spittle, and bind it on hard, or upon other unnatural risings.

Wind in the Stomach or Belly.

In *November* gather the Hips of Wild Roses, dry them in an Oven, and keep them dry for use all the year, ℞ 3 parts of the gross powder of them, to one of sliced Nutmegs, mix them together, take a spoonful of this in every draught of Beer you drink, and also in Broath, and doubt not of a cure, if you force the Wind downwards and not upwards. But if you cannot procure it, ℞ Rue, Centory, Betony, Penny-royal and Wormwood in powder, mixt it with Honey. Penny-royal distilled water is good.

Wounds or Cuts.

Heat the Balsom hot, lay it on with a Feather, and bind it up for 24 hours. See *Sores.*

Wound Drink.

℞ Sanacle, Self-heal, Agrimony, Wood-betony, Dandillion that hath the reddest leaves, Wild-dasies both roots and leaves, White-bottle, Bugle, Red-brier-leaves, Yarrow, Charvil and Plantain, of each one one handful, Ribwort, Mugwort, Wormwood a handful together, shred all these herbs and boil them in 2 Gallons of good Ale-wort till near one quart is wasted, Strain it, and put to the Liquor while it is warm one pint of Honey (and 2 quarts of White-wine if you will) work it with Barm or Yest as new Ale, tunn it into a Barrel, and after 2 or 3 days, drink about a pint in the morning, as much at night, till you are well, or Indifferent well recovered; take one Spring and Fall for prevention. This drink has cured the Kings Evil and such like dangerous running Sores by only drinking of it without using either Ointment or Plaister. But if your Sores are swelled with corrupt humors, use the *Cleansing Ointment*; and the Poultice mentioned in Swellings; If you cannot get all the Herbs, when you have need; make use of all them you can get.

Worms in Children.

℞ Wormwood half ℥, Sena half ʒ, Coriander-seed and Harts-horn of each half ℈, Rubarb ʒij, dryed Rue ʒj and half, being all in Powder together, give as much as will lie on a Groat mixt with Honey or Syrup in the morning, This carries away the matter wherein worms are bred; Or give of the Powder of the dried leaves of Bearfoot as much as will lie on a 3d. in Honey, or ʒj of the Powder of Centory, or boil it in beer, which also begets an Appetite; Likewise Hopseed, or Tansie-seed is good.

Being I was asked, by an Apothecary after the

Rate

Rate of 30 Shillings the Ounce, for natural Balsom, I thought good to let you know, how I have bought some of the Drugs following by the Ounce.

	s	d.		s.	d.
Best Aloes	0	6	Musk a grain	0	1
Cream of Tartar	0	3	*By the Pound.*		
Cypris-Turpentine	0	4	Bole-Armoniac	0	3
Dragons-Blood	0	4	BlackHelleboreRoots	1	0
Gum-Carrana	1	2	Ceruse	0	5
Harts-horn	0	1	Red or white Lead	0	5
Jalop	0	4	Juniper-berries	0	6
Mastick	0	5	Litharge of Gold	0	4
Manna	0	6	White Tartar	1	0
Myrrh	0	5	Salt-peter	1	0
Natural Balsom	1	6	Nerve-oil	0	6
Roman Vitroil	0	3	*Dr.* Salmons *prizes by the*		
Sena	0	6	*Ounce, for these.*		
Rubarb	0	8	Oil of Anniseeds	1	6
Agrick	0	8	Oil of Juniperberries	3	6
Quick-silver	0	4	Oil of Sulphur	2	0
Saffron	4	6	Oil of Vitroil	0	9
Red Correl	0	3	Salt of Wormwood	1	0

The Postscript to the Physical Receipts.

Dr. Mathews *Purge for all where Humours do offend:*

There are (saith he) many good Gentlemen and Gentlewomen which desire to do good to their poor Neighbours——— and that above 1000 Doses may be prepared in a few hours, besides it will keep almost as long as any Chymical Purge. I shall not transcribe it word for word as I find it in his Book (which he dedicates to all the Poor, especially those that fear the Lord, *&c.*) Because I have prepared it, and administred it with good success.

To prepare the Antimony for the Purge

℞ Crude Antimony one Ounce, best Salt Peter six Ounces, beat them together and serce them through

through a hair ſieve, ſet a Cruſible,or other well glazed pot on Charcoals to heat as the Coals kindle; when its through hot, put in a ſpoonful of the powder, if it burn put in more till you have put in all, ſtir it with the end of a Tobacco-pipe, let it burn till it has done Flaming and Sparkling, while it is hot pour it into a ſtone Mortar, beat it to fine powder and ſerce it through a Lawn ſieve and it is prepared for uſe. Note that if it doth not fire as you expect, touch it with a live Coal.

Antimony, thus prepared, is deprived of its Fecis and poyſonous qualities, looſing utterly its malign heat, it purgeth copiouſly without trouble and moleſtation, all groſs, cold and tartarous humours and openeth all ſtopped paſſages.

To prepare Scamony.

Take of Scamony one Ounce, beat it, ſerce it, having ready a ſheet of ſpungy thin brown paper faſtened to a hoop, like unto a Sieve, hold it over live Wood Coals wherein you have ſtrowed the powder of Brimſtone, ſo that the fumes thereof may take through the Paper, the Scamony being on the Paper, and if the Scamony ſtick to the Paper but as thick as an half Crown, caſt off the reſt on white Paper and ſcrape off that which ſticks for uſe, then put on the looſe powder of Scamony on the Paper again and caſt more Brimſtone on the Coals; do thus till all or moſt of the Scamony ſticks to the Paper, let it not ſtick too long, nor fume it too much. Scamony thus prepared is good againſt Choler, and all thin hot humours, having in it neither ſavour nor ſmell (as the other) and purgeth very eaſily, and without pain.

The third thing for this Purge is Cream of Tartar, which you may buy for 3*d*. the Ounce.

Note, That all theſe 3 are to be kept cloſe in fine powder, ſeverally in Glaſs-bottles, the dryer the better.

The greater Doſe for Men; Antimony 10 Grains, Scamony fourteen, Tartar eight. The

The Ordinary Dose for men, Antimony nine or ten Grains, Scamony 11 or 12 Grains, Tartar 6 Grains.

The Lesser Dose for men, Antimony 6 Grains, Scamony 9 Grains, Tartar 5 Grains.

For Children, between 7 and 14 years of Age, Antimony 7 or 8 Grains, Scamony 4 or 5, Tartar 3 Grains.

To Children give it with Sugar, or some sweet Liquor, but to others as you please (keeping house.) If the Ague or Disease cease not at the first taking, give it again for four or five mornings, ever diminishing the quantity, because the humour being once stirred, they are the easier carried out, or if this potion do little the first day, then add more with Discretion.

This Powder you may use in all Diseases where Humours do offend, either simple or compound, hot or cold, thin or gross, clammy or windy, Worms or Extention above Nature, it helpeth stopping of the Flowers, the Extention of the Belly, the Dropsie in the beginning, Tertians, Quartans, and all sharp Feavers, Chollick, Choller, Ill Appetite, Watching, Thirst, Unquietness of Mind; it helpeth against the Small Pox and Pleurisie; it is not to be given where is great evacuation, but expletion and fulness, it is much better then letting of Blood.

You may buy a pound of Antimony for one Shilling, the Scamony is the hardned Juice of the Root of the Purging Bind-weed, hot and dry in the third degree, it is brought from *Syria* and *Antioch*: chuse that which is clear, fine, brittle, yellowish when broken, not very weighty, being rub'd with Spittle grows milky; that which is thick, black and heavy is not so good, you cannot err in the choice of the other things.

Sir Phillip Paris his Plaister.

If laid to the Stomach it provoketh Appetite, laid

to

to the Belly it eaſeth the Chollick, laid to Reins it ſtoppeth the Bloody Flux, running of theReins, heat of the Kidneys and weakneſs of the Back, it healeth Swellings, Aches, Bruiſes, Chilblains, Kibes; it breaketh Fellons, Impoſthumes and Boyls, and healeth them; if skin be rubbed off the Legs one Plaiſter commonly cures, it draweth out running humours without breaking the skin, it healeth Diſeaſes of the Fundament, with divers other things: For Aches or Pains ſpread it on Sheeps Leather, but on Cloath to ſoften Corns, *&c.*

Thus made.

Take Sallet Oil 2 pound, red and white Lead finely ſerced, of each one pound, Caſtle-ſoap 12 ounces; beat theſe very well together in a new glaz'd Pipkin; then ſet them on the fire to boil about an hour, always ſtirring it with a ſtrong ſtick till the red turn grayiſh, drop a little on a board, and if it ſtick not to your Finger, when touched, ſo as to come off the board it is enough, dip Linnen Cloth therein (a little worn) and ſmooth them with a Sleek-ſtone, the reſt make into Rolls, it will keep good 20 years.

Liquoris Balls, called the Juice of Liquoris.

Take one Pound of green Liquoris (or that which is not too dry) bruiſe it in a Mortar, boil it in five Pints of Water till half is waſted; ſtrain it and ſet the Liquor in the Sun, or on hot Coals (in a well glazed Pot or Platter) till it is of a right thickneſs to make into Balls, that which is bought at the Shops (it's ſaid)the add they Pulp of Prunes.

A little of this, often melted in the mouth, is good againſt Coughs, Hoarſeneſs, Conſumptions, *&c.* If you make it for the laſt, add ℥j of the powder of Cinnamon, eſpecially if you be looſe.

Syrup of Anniſeeds.

℞ Anniſeeds bruiſed ℥iiij, ſteep them in a quart of Sack (in a cloſe Veſſel) by the fire for 3 days, ſtrain

ſtrain it, and with two pound of Sugar boil it to a Syrup. Thus you may make Syrups of other Seeds, it ſtrengthens the Lungs, and helps Coughs, Wheeſing and Spitting of Blood, expels Wind, eaſes the Chollick, provokes Urine, and cleanſeth the Reins. It is an excellent thing to give to young Children for the Gripes.

A Gentle Purge.

℞ Sena ℥vj, Damask-roſe-water half a pint, ſteep it in a cloſe Veſſel a day and night near the Fire, then add the Juyce of Pear-mains and Lemons, Sugar-Candy and Cinnamon, of each a Spoonful: Note that you had beſt infuſe the Cinnamon with the Sena, and ſtrain at laſt.

A Vomit and Purge.

℞ Roots and Barks of Elder, of each ℥j, Roots of Aſarabacca ʒiij, Cinnamon ʒij, boil them in Milk.

Dr. *Salmon* ſaith, it cures all intermitting Feavers, as Quotidian, Tertian and Quartan.

Arithmetick

AN ADVERTISEMENT TO THE READER.

☞ *Whereas several things being omitted, or left out of the Physical Receipts, I think good to add a little more as follows.*

For a Cancer or dangerous Fistula.

TAke the Drying Diet-drink in page 91, with these added, (*viz.*) China, Rhubarb and Butter-Bur Roots, of each ℥j, Burnet, Senacle, St. Johns wort, Wood Betony, Self-heal, Centory, the young tops, or rather the flowers of Rosemary, Elder, and Camomile; the young tops, or rather the buds of Hawthorne, Oak, and Bramble.

But those that have but little Money, and dwell near no Charitable neighbours, may use the Wound-drink in page 103. (all the Herbs thereof you may buy in *London* any time of the year for one shilling) adding thereto the Roots of small Fern, that grows on Tiles in great Towns, called Pollipody, Dock-roots, and the Herb Mercury, of each two handfuls.

To apply to the Cancer, if it is as a running Sore.

Take the largest sort of the Herb called Perewinkle, boyl it in spring water: to 2 quarts of the water, put Roch Allum ℥j and half, Tobacco

ashes 3 or 4 spoonfuls, wash the Cancer therewith (and syringe with it, if it be very hollow and foul) and dip a Cloth 4 double therein, and lay it on twice a day.

Some have found good by this.

Heat Lapis Calammaries ℥ij in the fire, and quench it twice in a pint of White wine, do so with ℥ij of Lapis Tutty in Red Rose water, then beat the stones to fine Powder, and put it in a Glass to the Wine, when you use it shake the Bottle, and dip a 4 double Linnen cloath therein, and apply it 3 times a day.

To apply to the Arm holes.

Take Henbane, Hemlock and Housleek, of each a handful, boyl these in White Wine or Water, and apply it warm.

If the Bone be corrupted.

Take White Wine, Plantane water, and Spring water, of each a pint, White Mercury a Pennyworth, stir these together in a Pewter dish, till it is black, then put it into another Dish and stir it also, still changing the Dishes till no blackness remains in the Liquor, put it in a Glass, and syringe with it, or wash the Bone therewith.

If the Cancer or other Sore remains hollow or runs, or likely to heal.

Take several wound Herbs, as Senacle, Self-heal, Bugle, *&c.* boyl them in Water, strain and add a little Honey of Rose, and a little Natural Balsom, and syringe with it.

To dry up a Sore.

Wash it with the Drying Water, in *p.* 85. Some People temper white Lead and Hogs Seem together, and spread it on a Cloath and every time they dress the Sore, scrape off the Humor that sticks to the Plaister, and cast it away, and then scrape off the Salve and work it well in the Palm of their Hands, and spread it on the same Cloth and apply it; others have dryed up Ev-

fores with a Salve made of ſtrong Ale-wort boyled to a right thickneſs; others with the Lead Plaiſter in *p.* 91. Some ſtop the Humor by mixing burnt Allom, Loaf-Sugar, and colour it with Bole Armoniack, and ſprinkle it on the Sore; Always remember that you do not begin to endeavour to ſtop the Humor in any running Sore, before you are throughly purged: And alſo it is good to be purged after an Ague, Feaver, Jaundice, Small Pox and Meaſles; leſt a worſe diſtemper follow.

Some People have been cured of the Evil, by boiling Elder Flowers in Milk, drinking the Milk, and applying the ſtrained Flowers twice a day, to the ſwelling or ſore till well: Swellings are diſſolved by applying a Poultice made of a healthful Man or Womans Urine and Oatmeal by boyling, adding a little Sallet Oyl, ſee *p.* 98, or or Dichylon cum Gummo.

Note, That if you cannot get freſh Eldern Flowers, nor have none dry, for the Evil aforeſaid, uſe the Inner Bark, and Leaves (if any.) Some People have waſhed and ſyringed a hollow ſore with the drying water in *p.* 86, with good ſucceſs; others have taken away dead Fleſh out of ſores, by uſing Verdegreaſe, Honey, and Venice Turpentine beat together; or the Oyl of burnt Feathers, or burnt Allom, or Vitroil, or Sal Armoniac: Others have aſſwaged Swellings, and Bunches in the Fleſh, by applying to them ſlices of lean Beef, not touching the ſlices with their Fingers; firſt waſh the ſwelling with Vinegar always, or Cow Dung fryed with Hogs-ſeame. Some take away Itching in ſores, or other places, by uſing the Oyl made by boyling Cream and Red Roſe Leaves to an Oyl, or Brimſtone and Soap mixt. Some uſe only freſh Butter to anoint, others bath the place with skim'd Milk, wherein Willow leaves have been boyled;

several have been cured of hollow sores by this Salve, as Sallet Oyl 2 Penny worth, Venice Turpentine 1*d*. Red Lead a half Penny worth, with Deer Suet, Bees Wax, and hard red Sealing-wax, of each the bigness of a Wallnut, boyl these till blackish, make Tents therewith, and rowl them in burnt Allom, and over that a Plaister of the same twice a day; Hard Knots in the Breasts, by applying Gum Ammoniacum dissolved in the Juice of Housleek, have been wasted; shrinking of Sinews have been holpen by using the Oyl of Sheeps Feet, or Oyl of Melilot, or Oyl of St. Johnswort; Wens have beeu wasted by the often bathing with Urine and Sallet Oyl well beaten together; By drinking Beer often wherein Calendine have been soaked, some have been cured of the Scurvy and Jaundice: Some have been cured of inward pains, by drinking Beer wherein much ground Ivy hath been put; outward pains have been cured by anointing the place with a spoonful of Oyl of March mallows, adding to it a quarter as of much liquid Laudanum: Over much sweating in Bed, hath been helped by drinking a draught of new Milk boyled, and about a spoonful of beaten Pepper stirred into it: The Pain of the Running Gout, hath been taken away by drinking 40 drops of Elixir Exonerates in good supping at going to Bed, some anoint the pained place with Venice Soap, and the distilled water of Frogs Spawn, or apply Comfry roots beaten with whites of Eggs; this last is very good also to apply to weak Joynts, Sprains and broken Bones: Head-ach hath been holpen by taking a spoonful of the Powder of Rosemary, Camomile, and Betony in Beer often, see p. 89. Those that cannot hold their Urine, boil a pint of new Milk, a quartern of Brandy, and a spoonful of Honey, and drink it at Night:

For a Consumption, Shortness of Breath, or Cough, and the like.

Take Liquoris sticks, Annisseeds, and brown Sugar-candy, of each an ounce and a quarter, Saffron and Nutmegs of each a penny worth, Elecompane Root a little, all in powder, put them into half a pint of Honey that hath been boyled and skimmed, take a little often:

A Purge to take Spring and Fall, to cleanse the Blood against Choler and Melancholy, used by Rich men.

Take Tamarind one ounce and half, boyl it in 3 pints of water, then put to it Senna, Coriander seed, and Liquoris, of each ℥ij, boyl it a little, strain it, and drink half a pint every morning, as you have need, if you drink more keep house.

Another for a Cough, &c.

℞ Old Conserve of Roses ℥ij, Olibanum 2d, Honey of Roses ℥j, Oyl of Sweet Almond half ℥, Methridate half ℥, mix, dose the Quantity of half a Nutmeg 3 times a day:

Chollick or Windiness in the Body:

℞ Melilot, Field Thyme, and the Tops of Rosemary, of each a handful, rather more of the Melilot, shred and boyl them in Posset drink, drink frequently thereof.

An Ointment to cure the Eryfipulas, or Bladdering of the Skin, Shingles, Burnings and Scaldings; it hindereth the falling down of any moist Humour, to any Ulcer or part of the Body, being spread upon Cap Paper thin, and laid over the whole distempered place, against slight Itch or Scabs, &c.

℞ Litharge of Gold finely pounded half a ℔, Ceress ℥iiij, Vinegar ℥v, Oyl of Roses 1℔, put the Litharge into a Mortar with the Cerus, pour into it now a little Oyl, then a little Vinegar, working them up and down with the Pestle until it be white, this not to lye next the Sore that runs, but some other proper Plaister under it, Morning and Night, as that in *p. 91*: Or use Unguentum Album

Album mixt with Sallet Oyl on paper, instead of the Litharge Oyntment.

To conclude, take the following drying Diet Drink, for all manner of Sores whatsoever.

Take Guiacum ℥iiiij, Sarsaparilla ℥iij, Sassafras ℥ij, Liquoris ℥j and half, Raisons 1℔, Anniseed and Fennel seed of each ℥j, Agrimony, Sage, Tunhoose, Camomil flowers, Dandelyon, St. Johns wort, Fumitory, Burnet, Selfheal, Centory, Senacle, Red-Rose leaves, Plantane, Speedwell, Golden-Rod, Scabius, Red-brier Leaves, of each a handful; the Roots of Bistort, Tormetle, Comfrey, and Butter-bur, of each ℥j and half; all these being grosly beaten, let them stand in a hot Infusion all night by the Fire, in 3 Gallons of Spring Water, the next day boyl them to the consumption of near a third part, then strain it, and put to the Liquor 1 pint of Honey, and 1℔ of Sugar, and give it a boyl, when it's cold, bottle it up, and drink frequently thereof till well. And if you see cause the party may omit a day in the Week, and take 4 or 5 of Dr. *Salmons* Family Pills in the Morning fasting, *Bromfields* Pills, or some other good Purge. Note, That the Herbs, are commonly sold, at *London*, all the year, at 1d. the handful, the 5 Ounces of Guiacum for 2d. Sarsaparilla ℥iij 8d, Sassafras ℥ij 2d. This is approved by several able Physitians, as the only Drink for Ulcers. Some only take 60 drops of the tincture of Antimony in Sack twice a day.

Breast broken, or not broken.

℞ Bees-wax, Rozin, Sallet-Oyl, Deers-suit, of each one Ounce and a half; and a quarter of an Ounce of Soap, melt your Wax, Rozen, Oyl, and Deers suit together, then strain in your Sope and let it cool, spread this salve on a piece of Cloth and cover the Breast therewith, let there be a round hole for the Nipple to appear in the middle of the Plaister, this will draw it, and break

it

it without trusting to any other Salve.

Gripe in the Guts, a present Remedy.

℞ a Quartern of Brandy, and grate a little whole Nutmeg to powder, and put it in the Brandy, then take a Yolk of an Egg, and 4 spoonfuls of fair water, and beat the Egg and Water very well together, then take the Brandy and put it in a Poringer, and set it on Fire, and let it burn till the Porringer handle be so hot that you are not able to hold it, then take your Egg and mix it with the Brandy very well together, then put as much White Sugar as will sweeten it, then set it on the Fire, and keep it stirring, that it may not boyl, till it be thick and hot, and then eat 2 ar 3 Spoonfuls, or if you can eat all, and it will give you present ease, *probatum* Dr. *Burgess.*

Another.

℞ an Ounce of Sirrup of Clove-gilli-flowers, one penny worth of Surfeit water, one penny worth of Spare-mint-water, one penny worth of Mithridate, and one of Diascordial, mix them all together, and take now and then a spoonful.

For the Jaundice.

℞ of the Inner Rhine of a Barbery-tree two ounces, of Centaury the lesser half a handful; of Safflon 3 Grains, infuse these all night in a pint of White wine, drink half a pint fasting for three Mornings together, *&c.*

For Loosenes and Vomiting of a Child that is breeding of Teeth.

℞ 3 Quarts of running water, and put in a *rd.* of burnt Harts-horn, and the Top Crust of a half penny Loaf, and let it boil till it be half consumed, then strain it, and sweeten it with fine White Sugar. Let the party drink what they please of it, and with Gods assistance it will do them them good.

ADVER-

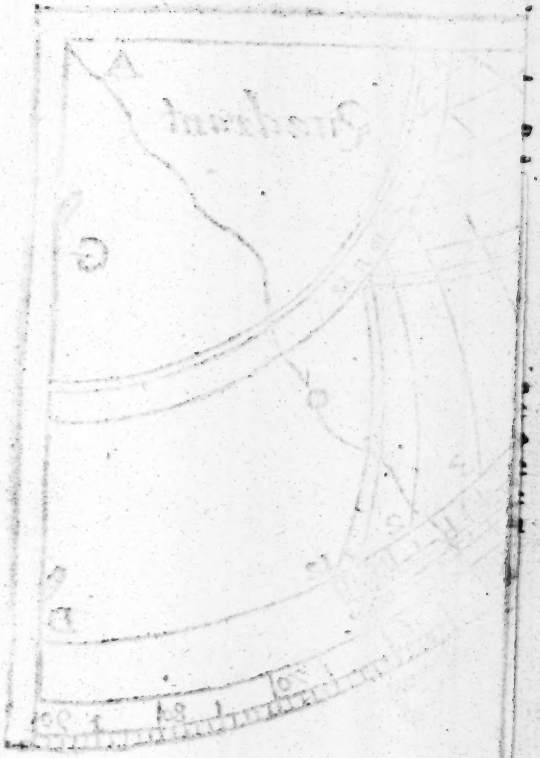
ADVERTISEMENT.

A *Great Secret and never failing Remedy, that presently Cures all manner of* Scalds *and* Burns, *without Scars, or disfigurement to the place injured.* &c. *With once or twice applying it to the grieved Part, suddenly after the Hurt received. One Bottle will cure* 40 *Accidents, though never so dangerous; and with every Bottle printed Directions will be delivered how to apply it; and this being always ready, in private Families, where too frequently such Misfortunes happen, will not only save the Patient the long enduring of an intolerable pain, and prevent, many times, the Loss of the Member afflicted, when unskilful Persons undertake the cure, but at least the charge of a Chyrurgion.*

For Proof of its rare Effects, take the following Attestations of Persons whose Credit is undoubted. It cured Mr. Tuby *a* Distiller *in St.* Olaves-street, *of a dangerous burn in the Hand. A Child of Mr.* Stapletons, *at the* Castle *in* Southwark, *whose Finger was in danger of being lost. Mr.* Billing *at the* Red Lyon *in St.* Mary-Overs *Church-Yard, who had a dangerous Blast by Gunpowder. Mr.* Willsons, *Man and Maid, at the* Spread-Eagle *in St.* Bartholomews-Lane, *of two dangerous Burns. Mr.* Paul *a Hatmaker at* Wandsworth, *of two dangerous Scalds in his Arms. All these immediately without Pain. You may likewise enquire at* Woods Coffee-House, *in St.* Olave-street. Gardeners Coffee-House, *in* Duke-street *in the* Park. *Mr.* Lessons *at the* Crown, *Mr.* Fildore *at the* Bull. *Mr.* Heath, Silk-Dyer, *at St.* Mary-Overies *Dock, all in* Southwark, *Mr.* Laws, *in* Throgmorton-Street. *At Mr.* Rumbols, *near the* Grecian *Church in* Soho, *&c.*

It is sold by Tho. Howkins, *in* George-Yard, *in* Lombard-Street, *at* 1 s. *the Bottle.*

ARITH-



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ARITHMETICK

Consisteth chiefly of these Five General Parts, *Numeration*, *Addition*, *Subtraction*, *Multiplication*, and *Division*. But first, begin with

NUMERATION.

☞ *Note*, That every Part, Example, or Lesson, shall be marked with a Numeral Letter for the first part, wishing the Learner, who desires to learn without a Tutor, that he be perfect in one part before he proceeds further, taking all the Examples in order as they lie; so may he learn with delight, the first Lesson.

I. *How to Write and Read the 9 Figures.*

One.	Two.	Three.	Four.	Five.	Six.	Seven.	Eight.	Nine.	Cypher.
1	2	3	4	5	6	7	8	9	0
			4	5			S	c	

For the easie learning how to write the Figures, finish the top of the Figure 5 last; to make the Figure 6, begin at the top; the Figure 8 begin, as if you was to make a little s; and for the Figure 9, be-

gin it as you do a little a, as I have shewed under the Figures 4, 5, 8, 9.

II. *A Figure standing alone, signifies no more but it self, as 5 is Five; 9 is Nine,* &c.

But if you place another Figure to the Figure 5, on the left hand, thus, 35, it makes thirty five.

And if you place another figure on the left side the 35, as thus 435, it makes four hundred thirty five.

Hundreds.	Tens.	Ones.
4	3	5
1	0	0
	1	0

Because the figure 5 is in the place of Ones, so is but five (as every figure next the right hand is no more than it self) the figure 3 being in the place of tens, makes it 3 tens, or thirty, and the figure 4 is in the place of hundreds, as appears by the little Table above.

Lastly, Next below the 435 is 100, because the figure 1 is under the word hundreds, next below that, is 10, because the figure 1, is under the place of Tens.

III. *How to Read Nine Figures;* As 276.743.476.

Between every three Figures, it is convenient to set a Comma, or Dot, because they are to be read by three's (as the last Example) only remember, that to the three figures in the middle, you must give the Sir-name of thousands, and those three next the left hand the Sir-name of Millions, saying 276 Millions, 743 thousand, four hundred seventy six, as appears by the Table in the Margent.

Millions.	Thousands.
276.743.476	
1.691	

But

☞ But to add up this Sum without Dotting or Pointing, do thus, saying, 6 and 7 is 13, and 6 is 19, and 6 is 25, I set the odd 5 between the Lines, and carry the 20 as two to the middle row, saying, 2 that I carry and 3 is 5, and 7 12, and 3 is 15, I set down the odd 5 between the Lines, and carry the 10 of the 15 as 1 to the last row, saying, 1 that I carry, and 1 is 2, and 1 is 3 to be set between the Lines also; see the Sum before.

II. *In this Example is four Sums of Money, the first is thus read,* 17 *Pounds,* 16 *Shillings, and* 1 *Penny.*

The Letter L over any figure or figures shews that they are pounds in Money, ℔ stands for pound weight, the Letter S is set over Shillings, and the Letter D over Pence.

The 12 that's set over Pence, shews that I must dot at every 12 in suming up the row of Pence.

The 20 over the row of Shillings, shews, that I must dot at 20 in adding up that row, and the 10 over the pounds, shews, that I must dot at 10. going up each Line of the Pounds.

To add up the Sum, begin at the bottom next the Right Hand, saying, 10 *d.* and 9 *d.* is 19 *d*, set a dot against the 9 for 12 *d.* and carry up the odd 7, saying, 7 as I carry, and 7 is 14, set a dot for 12 *d.* also, and carry the odd 2 higher to the 1, saying, 2 and 1 is 3 *d.* to be set below the Line.

	10.	20	12
	l.	*s.*	*d.*
	17.	16.	01
	20	11.	07.
	23	18.	09.
	72.	7	10
Sum	1	03	03

Next in the row of Pence, I find 2 Dots, that is 2 *s*, which I carry to the place of Shillings, saying, 2 that I carry and 17 *s*. is 19, and 8 is 27, and the 10 of the 18 makes 37, so I set a dot against the 18 for 1 *l*. and carry 17 of the 37 higher, saying 17 and 11 is 28, where I set a dot for 1 *l*. again, and carry the odd 8 *s*. saying; 8 that I carry, and 6 is 14, and 10 is 24, where I set a dot for 1 *l*. more, and the odd 4 *s*. I set between the Lines.

Next in the row of Shillings I find 3 dots for 3 *l*, which I carry to the row of pounds, saying, 3 that I carry, and 3 is 6, and 3 is 9, and 7 is 16, where I dot for 10 (as in the 1 Example) and set down the odd 6 *l*. between the Lines, then 1 that I carry, and 7 is 8, and 2 is 10, and 2 is 12, and 1 is 13, to be set between the Lines also, and the total Sum is 136 Pound, 4 Shillings, and 3 Pence.

☞ But to add up this Sum, or any other in Addition of Money, without using Comma's, or Dots. Do thus,

Have this Table by Heart.

d.		*s.*	*d.*
20	is	1	8
30	is	2.	6
40	is	3.	4
50	is	4.	2
60	is	5.	0
70	is	5.	10
80	is	6	8
90	is	7	6
100	is	8.	4
110	is	9	2
120	is	10.	0

Saying 10 *d*. and 9 *d*. is 19 *d*. and 7 is 26, and 1 is 27 *d*. that is two Shillings and 3 *d* (as you may know by this Table in the Margent, which should be learned by Heart, for 30 *d* is 2 *s*. 6 *d*. &c.) the odd 3 *d*. I set between the Lines (as before.)

Next the 2 *s*. I carry from the place of Pence to

But suppose, there had been Cyphers in the number, as 270.043.024, then these nine places must be read thus, two hundred and seventy Millions forty three thousand, twenty four.

IV. *How to read fifteen Figures or under.*

C. Millions of Millions.	Ten Millions of Millions.	Millions of Millions.		C. Thousand Millions.	Ten Thousand Millions.	Thousand Millions.		C. Millions.	Ten Millions.	Millions.		C. Thousand.	Ten Thousand.	Thousand.		Hundreds.	Tens.	Ones, Units.
5	7	6	.	2	3	4	.	7	6	3	.	4	2	4	.	1	2	2

This Table ought to be Learned by Heart.

This Table is to be read by three's, as is before taught, only observe, you are to give the sir-name (so called) to every third figure, that is, the words that are set the nearest to the figures, as thus 576 Millions of Millions; 234 thousand Millions; 763 Millions; *424 thousand, 122; If you are to set down 1 thousand, begin at Units, or Ones in the Table, saying, Ones, Tens, Hundreds, Thousands, where set the figure 1, and the rest are Cyphers, and so on to a Million, as this Table sheweth,

Millions.	C. Thousand.	Ten Thousand.	Thousand.	Hundreds.	Tens.	Units.
1	0	0	1	0	0	0
	0	0	0	0	0	0
Anno			1	6	9	1

ADDITION

Teacheth to add divers Numbers, into one Sum, which is the Total.

I. *Suppose there is an Orchard.*

Apple-Trees	136.		
Pear-Trees	07.6	346 Sheep	402
Cherry-Trees	107.	125 Lambs	301
Plumb. Trees	036		
		471 In all	103
Trees in all ——	355		
			806

For the ease of the young Learner, I shall add up this Sum by setting Commas, or Dots, thus.

Saying 6 and 7 is 13, I set a Dot against the 7 for 10, and carry the odd 3 upwards, saying 3 that I carry and 6 is 9, and 6 at the top makes 15, where I set a Dot for 10, and set the odd 5 between the Lines.

Next the two Dots that I find going up the first row, I carry to the middle row, saying, 2 that I carry and 3 is 5, and 7 is 12, where against the 7. I set a Dot, and carry the odd two above 10, to the 3 at the top makes 5, to be set between the Lines.

Lastly, One Dot that I carry from the middle row, and the two figure ones in the third row makes 3, to be set between the Lines, and the number of Trees are in all, 355.

☞ The Directions before going I hope are sufficient for the Learner to understand the Sums of Money following, which are ready cast up.

l.	s.	d.
76	10	6
63	13	7
34	16	8
46	00	0
221	00	9

l.	s.	d.	q.
36	0	6	2
43	3	7	3
47	6	8	2
18	16	9	3
145	7	8	2

VI. *At* 3 d. *half-penny the pound Sugar, what will* 112 *l. cost (being one hundred weight.)*

The RULE.

So many Farthings as one pound cost, reckon (always) so many two Shillings, and so many Groats, then add, with or without the Pen.

		s.	d.	
For	Farthings 14 reckon—	14	0	See the Table of prices in Reduct.
	Farthings 14 reckon—	14	0	
	Groats 14 reckon—	4	8	
	Answer	32	8 per C.	

VII. *If one pound of Leather cost* 7 d ½ *(that is* 7 d *half penny) what will* 2½ C *(that is* 200 *pound and half) cost, or* 280 *pound weight, after that Rate?*

To perform this Question it is needful to have by heart the little Table in the 2d Example aforegoing.

	l.	s.	d.
200 Sixpences, makes 100 s. or	5	0	0
80 Sixpences, make	2	0	0
200 Pence, make	0	16	8
80 Pence, make	0	6	8
200 Halfpennies, make	0	8	4
80 Halfpennies, make 40 d. or	0	3	4
Price of the Leather	8	15	0

VIII. *In this Example of Dry measure, you must note, That the figure 4 over the Peck, shews that 4 Pecks make a Bushel, and also that I am to dot at 4 in summing up the row of Pecks, then 8 Bushels make a Quarter, and 10 Quarters make a Last, the first line of the Sum is thus read, 463 Lasts, 3 Quarters, 4 Bushels, and 2 Pecks.*

	10	8	4
Lasts.	*Quarters.*	*Bushels.*	*Pecks.*
463	3	4	2
765	4	3	1.
453	8	6	3
1682	6	6	2

To add up this Sum of Dry Measure, begin on the right hand (as before is taught) saying, 3 and 1 is 4, where I set a dot for a Bushel, and the odd 2 above set between the Lines: Next, one dot that I carry from the place of Pecks, to the row of Bushels, saying, 1 that I carry, and 6 is 7, and 3 is 10, where I set a dot for 8 Bushel, that is a Quarter, and go up to the odd 4 with the 2 makes 6, to be set between the Lines: Next, 1 that I carry from the row of Bushels to the Quarters, saying, 1 that I carry, and 8 is

to the row of Shillings, saying 2 and 7 is 9, and 8 is 17, and [illegible] is 18, and 6 is 24, I set down the odd 4 *s.* between the Lines, and carry the 20 down the Shillings saying, 20 and 1 is 30, and [illegible] is 40, and 1 is 50, and one is 60 *s.* which is 3 *l.* which I carry to the place of Pounds, saying, 3 and 2 is 5, and 3 is 9, and 7 is 16, I set down the odd 6, and carry 1 ten to the last row, saying, 1 that I carry, and 7 is 8, and 2 is 10, and 2 is 12, and 1 at the top is 13, to be set below between the Lines, and the total is 136 *l.*——4 *s.*——3 *d.*

III. *Suppose I spend* 7 d. *a Day, what comes it to by the Year.*

	l.	*s.*	*d.*
Seven Pounds	7	0	0
Seven Halfpounds	3	10	0
Seven Groats	0	2	4
Seven Pence	0	0	7
By the Year	10	12	4

The same is to be observed at 8 *d.* a Day, say 8 *l.* and Half pounds, *&c.* or any other number of Pence by the Day, adding it up, as above.

IV. *To add up this Sum of Money, set it down on Paper, and proceed as is shewed in the* 2d. *Example.*

Note,

	10	20	12	4
	l.	*s.*	*d.*	*q.*
	179	12	04	2
	167	17	10	0
	098	05	04	2
	100	00	00	0
	150	15	04	1
Total	696	10	11	1

Note, That the Letter *q.* is set over the Farthing-row, and the Figure 4 over it, shews, that you are to dot at 4 going up the Farthing-line, and a Cypher on the left hand of any figure signifies nothing in value, yet are sometime set to make the rows of figures range even, as you may see in the row of Pence above. The Total of this Sum comes to 696 *l.*——10 *s.*——11 *d.*——1 *q.*

PROOF.

To prove any Sum of Money, or other Sum in *Addition*, add the Sum downwards, as you are taught to add upwards.

V. *If you are to set down on Paper, five and twenty shillings, you must not set it thus,* 25 s. *when you have more Money to add to it, but*

	l.	*s.*	*d.*
Thus	01	05	00
A Mark is	00	13	04
A Noble	00	06	08.
Half a Crown	00	02	06
Twenty pence	00	01	08.
Sixteen Pence	00	01	04
In all	01	10	06

This Sum may not be amiss for the Young Learner.

☞ The

8 is 9, and 4 is 13, where I set a dot for 10 (according to the figure 10 that stands above the Quarters) and carry 3 to the 3 at the top makes 6, to be set between the Lines under the Quarters.

Lastly, 1, or 10 Quarters that I carry, and 3 is 4, and 5 is 9, and 3 is 12, the odd 2 of the 12 I set below, and carry 1, so finish the Sum as you are taught in the latter part of the foregoing first Example, and the Total Sum is 1682 Lasts, 6 Quarter, 6 Bushel, 2 Pecks.

☞ This Example I hope is sufficient for the diligent Scholar, to have understanding of all the Sums following in Addition.

Chaldren.	4 *Quarters.*	8 *Bushels.*	4 *Pecks.*
27	3	4	1
72	2	7	3
19	1	6	2
120	0	2	2

Liquid Measure.

Barrels.	2 *Kilderkins.*	18 *Gallons.*	4 *Quarts.*
6	1	12	2

Barrels.	4 *Firkins.*	8 *Gallons.*	2 *Pottles.*
16	3	6	1

Averdupois

Averdupois greater Weight. 112 l. *the Hundred Weight.*

	20	4	28	16
Tuns.	*C.*	*Quarters.*	*l.*	*Ounces.*
62	17	2	19	12

	C.	q.	℔.	*l.*	*s.*	*d.*
A Box up to *London*	1	3	14	0	7	6
A Parcel up	5	1	24	4	6	9

The Carriers set down their Bills in this manner, in short, A Box up weighing 1 hundred 3 quarters, and 14 pound, comes to for Carriage, 0 *l.* 7 *s.* 6 *d.*

Averdupois Lesser Weights.

	16	16
l.	*Ounces.*	*Drams.*
8	15	12

Troy *Weight.*

	12	20	24
l.	*Ounces.*	*Pennyweight.*	*Grains.*
7	6	12	17

Of Measures in Length.

	3	8	11	20	3
Leagues.	*Miles.*	*Furlongs.*	*Scores.*	*Yards.*	*Feet.*
763	2	4	6	17	2

	12	4	4
Dozens.	*Yards.*	*Quarters.*	*Nailes.*
756	8	2	2

Axes

Acres:	4 Roods.	40 Poles.
542	2	12

Of Time.

Years.	13 Months.	4 Weeks.	7 Days.	24 Hours.	60 Minutes.
673	7	3	3	12	27

Of Paper.

Bale.	10 Reams.	20 Quires.	25 Sheets.
25	9	17	12

Apothecaries *Weights.*

℔.	16 Ounces.	8 Drams.	3 Scruples.	20 Grains.
237	8	3	1	12
654	12	6	2	16
892	5	2	1	8

This last is set as a Sum, whose Total comes to 892 Pound, 5 Ounces, 2 Drams, 1 Scruple, 8 Grains. The figures signifie (that are on the top) as 20 Grains make a Scruple, 3 Scruples make a Dram, 8 Drams one Ounce, 16 Ounces a Pound.

By the same Rule, Read the several Weights and Measures above, which are set in order to make Sums of, or to begin a Sum, thus set for brevities sake.

How to cast up Sums of Money by Counters, or Farthings, very useful for those that never learned to write Figures.

First make three marks or choaks upon a Table about three Inches asunder, like these.

l l l

Then let the first mark be supposed to be the place of Pounds, the second the place of Shillings, and the third next the right hand the place of pence, (and you may make another if you will for the place of Farthings.)

Secondly, Now to place your several Sums to be cast up, as suppose I begin with 3 *l.* 7 *s.* 3 *d.* lay down as many Counters at each mark thus,

l	l	l
o	o	o
o	o	o
o	o	
	o	
	o	
	o	
	o	

And when you put another Sum to this, as suppose 17 *s.* a'ready, makes 24 *s.* then set one Counter more in the place of pounds, and leave but 4 in the place of Shillings, and your Sum is 4 *l.* 4 *s.* 3 *d.* and so add more at pleasure.

Lastly, But if you are to cast up several Sums that are pounds, without shillings, or pence, then mark upon the Table 4 marks as before.

These

These being so easie, I need not write much, for further Directions, observing the four places.

Thou.	Hundr.	Tens.	Ones.
o	o	o	o
o	o	o	o
o		o	o
		o	o

Read them thus, the three Counters next the left hand, stand for three thousand, next two hundred, next four tens, or forty, and three at the last, that is 3243.

Thus you may make the Sum bigger or lesser as you please, even from one pound to thousands.

So I hope that whoever can do it, will not grudge to teach their Neighbours near them (if they desire it) *Gratis*.

SUBTRACTION.

Subtraction taketh a Lesser Number out of a greater, and leaveth the Difference under the Line.

I. *Suppose that a Book was Printed in the Year of our Lord 1619, or the Date upon a Sign, or a Lease begun then; How many Years is it since?*

Always set the present Year highest	1691
A Book Printed in the Year	1619
Years since	0072

To Subtract the number 1619, from the Year 1691, do thus,

Saying, Take 9 from 1, that I cannot do, therefore I borrow 10, to add to the 1 makes 11, then say, take 9 from 11, rests 2; next 1 that I borrowed (which was 10) I carry to the lower 1 saying, 1 that I carry, and 1 is 2, take 2 from 9, rests 7, to be set between the Lines, then 6 from 6 rests 0. Lastly, 1 from 1 rests 0, so that it is 72 Years since the Book was in the Press.

For Proof, add the number 1619 to 72, (by the 1st. Example in Addition) and if it make 1691, it is right, otherwise not.

1619	from
0072	take
Proof 1691	Rest.

II. *Sup.*

II. *Suppose I Lent a Man* 286 l.—10 s.—4 d. *of which he hath paid me* 160 l.-12 s.-6 d. *The Question is, What remains in his hand unpaid?*

With the Pen I set down the two Sums of Mony, thus,

		l.	s.	d.
		10	20	12
	Lent	286—	10—	4
	Paid	160—	12—	06

To Subtract or take the lower Sum of Mony from that over it, begin on the right hand, as is taught in Addition.

Saying, take 6 *d.* from 4 *d.* that I cannot do, therefore I borrow the 12 that stands over the Pence (because 12 *d.* is 1 *s.*) and add it to the 4 *d.* makes 16 *d.* Then take 6 *d.* from 16 *d*, rest 10 *d.* to be set below the Line, as may be seen in the Sum below.

Next, 1 that I borrowed at the 4 *d.* I carry to the place of Shillings (though it was 12.) Saying 1 that I borrowed, and 12 *s.* is 13 *s.* take 13 from 10, that I cannot do, therefore I borrow the 20 above (because 20 *s.* is 1 *l.*) and add to it the 10 *s.* makes 30 *s.* then take the 13 from 30, rests 17 *s.* to be set below the Line.

Next, 1 that I borrowed at the place of Shillings (though 20) I carry to 0 in the place of Pounds, saying, 1 and 0 is 1, take 1 from 6, rests 5 to be set below the Line, where I borrowed nothing; therefore, I say, take 6 from 8, rests 2 to set below the Line, and 1 from 2, rests 1 to be set below also, and the Sum unpaid comes to

l.	s.	d.
125—	17—	10

	10	20	12
	l.	*s.*	*d.*
Lent	286	10	04
Paid	160	12	06
Unpaid	125	17	10
Proof	286	10	04

For proof of Subtraction of Money, add the Sum paid, and that unpaid together, which if it make the Sum lent, it is right Subtracted, otherwise not. Saying, 10 *d.* and 6 *d.* is 16 *d*, set 4 below, and carry the 1 *s.* to the place of Shillings, saying, 1 that I carry and 17 is 18, and 12 is 30 *s*, set down below the 10, and carry 20 *s.* or 1 *l.* to the place of pounds, saying, 1 that I carry and 5 is 6, and 0 is 6 to be set below, then 2 and 6 is 8 to be set below. Lastly, 1 and 1 is 2 to be set down, so doth the lower Sum agree with that above, for the Sum paid, and that unpaid, will make the Sum Lent.

☞ Note, That by the Example above, I hope the Studious will find out how to Subtract any other Sums of Money, as also of Weights and Measures.

		20	12
	l.	*s.*	*d.*
Lent	30	00	00
Paid	27	17	03
Unpaid	02	02	09
Proof	30	00	00

	10	20	12
	l.	*s.*	*d.*
from	100	0	0
take	092	17	11
Rest	007	02	01

Lent

	10	20	12	4
	l.	*s.*	*d.*	*q.*
Lent	470867	10	5	0
Paid	193689	17	8	2
Unpaid	277177	12	8	2
Proof	470867	10	5	0

	10	10	8	4
	Lasts.	*Quarters.*	*Bushels.*	*Pecks.*
From	642	3	5	1
Take	368	7	6	2
Rest	273	5	6	3
Proof	642	3	5	1

By this Sum is shewed, That I am to subtract 368 Lasts, 7 Quarters, 6 Bushel, and 2 Pecks; from 642 Last, 3 Quarters, 5 Bushel, and 1 Peck.

The figure 4 over the Pecks, shews, That I must borrow 4 (if need be) and 8 at the Bushels, 10 at quarters, and 10 at Lasts, as is before shewed in Subtraction of Money before,

By the same Rule may be subtracted all the Sums in Addition of Weights and Measures, being placed as the Sum above.

Lastly, Suppose a Lease being made in the Year 1647, for fourscore and nineteen years, how many years of it is past this present year 1691, and how many to come.

The

The present Year--1691		1647	Lease began
The Lease began--- 647		99	Terme
Years Expired----0044		1746	From
		1691	Take
		0055	Years to come.

Suppose a Lease was granted the first of *May* in the 17th. Year of the Reign of Q. *Elizabeth*, for 119 years, in what Year of our Lord will that Lease be expired, and how many years are yet to come.

I look in the Table of Kings in an Almanack, and find her Reign to begin, in the year of our Lord,

	1558
To which I add the 17th. year of her Reign	17
The year in which the Lease began	1575
To which I add the years granted	119
The Lease ends in the year	1694
From which Subtract the present year	1691
Remains	0003

So that there is three years unexpired of the Lease.

MUL-

Times		is
2	2	4
	3	6
	4	8
	5	10
	6	12
	7	14
	8	16
	9	18
3	3	9
	4	12
	5	15
	6	18
	7	21
	8	24
	9	27
4	4	16
	5	20
	6	24
	7	28
	8	32
	9	36
5	5	25
	6	30
	7	35
	8	40
	9	45
6	6	36
	7	42
	8	48
	9	54
7	7	49
	8	56
	9	63
8	8	64
	9	72
9	9	81

Multiplication.

To Read this Table of Multiplication.

Begin at the large Figure 2 on the left hand, and the 2 on the top of the Table.

Saying 2 times 2 is 4 in the right hand Column, then 2 times 3 is 6, and 2 times 4 is 8, and so on to the end of the Table.

The best way to have this Table by heart, is the often reading it over.

I. *To Multiply* 264 *by* 3.

Place the bigest number highest always, keeping in mind what the Numbers are called, as

Multiplicand ———— 264
Multiplier ———— 3

Product ———— 792

For 264, multiplied by 3, the Product is 792, Done thus

Saying, 3 times 4 is 12, I set down the odd 2 of the 12 between the Lines, and keep in mind the 10 as one.

Saying 3 times 6 is 18, and 1 that I kept in mind is 19. I set down the odd 9 between the Lines, and the 10 I keep in mind as 1.

Lastly,

Lastly, 3 times 2 is 6, and the 1 that I kept in mind, makes 7 to be set between the Lines, and the Product is 792, as above.

II. *When you are to Multiply by the figure 1, and any number of Cyphers, you need do no more, than add the Cyphers on the right hand the Multiplicand, thus,*

To Multiply 564 by 100,

Multiplicand—564
Multiplier——100 } Product 56400, Answer.

III. *To Multiply* 10, 100, 1000, *&c. or by* 20. 200, 2000, &c. *and the like, being always the Multiplier, place them so, as all the Cyphers stand on the right hand, as appears by these 2 Sums.*

27——Multiplicand——232
20——Multiplier————300

540——Product————69600

Here I multiply 27 by 20 thus, for the Cypher of the 20, I set it under it between the Lines. Next 2 times 7 is 14, I set the odd 4 between the Lines, and keep the 10 as one in mind. Lastly, 2 times 2 is 4, and the 1 I kept in mind is 5 to be set between the Lines, and the Product is 540: After the same manner multiply 232 by 300 above, and the Product is 69600.

IV. *If*

IV. *If 29 Men, have each 264 Lambs, How many Lambs have they in all?*

The Sum being placed as in the Margent, begin on the right hand (as before.)

Lambs——264
Men——29

Saying 9 times 4, or 4 times 9, which is all one that is 36, I set 6 below the line, and keep the three tens in mind as 3.

Next 9 times 6 is 54, and 3 I kept in mind is 57, the odd 7 I set below the Line, and keep the 50, as 5 in mind.

Lambs——264
Men——29
2376

Next, 9 times 2 is 18, and 5 that I kept in mind makes 23, which I set below the Line, and the figure 9 is done with, which I cancel or dash with the Pen.

Again 2 times 4 is 8, which I set under the figure 2 and 7.

Lambs——264
Men——29
2376
528

Next, 2 times 6 is 12, I set 2 of the 12 under the figure 3, and keep 1 in mind.

Lambs——7656 in all

Next, 2 times 2 is 4, and 1 I kept in mind makes 5, to set one place further, and I have finished the multiplying patt.

Lastly, To finish the Sum, add up the numbers 2376 and 528 together, by the 1. Example in Addition, to begin thus, the 6 that is alone, I set below, then 8 and 7 is 15. I set down the 5, and carry the 1 ten, then 1 and 2 is 3, and 3 is 6 to be set below, then 5 and 2 is 7, set it down, and the Product or number of Lambs, is 7656.

☞

☞ I was the more large in working this Example, because it may be as a Rule to work other Examples in Multiplication by, if well practised by the Pen and Reading together, being the only way to attain it the sooner.

V. *Suppose a piece of Land be 236 Poles in length, and 182 Poles in breadth; how many square Poles is therein?*

Multiply 236 by 182, by the last Example, and the Product will be 42952.

Note, That 16 Foot and a half Square, is a Pole; see Reduction of Land measure, and the 17th. Example in measuring of Land by Feet measure.

Length—	236
Breadth—	182
	472
	1888
	236
Square—	42952 Poles.

VI. *When Cyphers are in the Multiplier, you should miss them, minding to place the first figure that comes by Multiplying just under that Figure you multiplied by, for after I have multiplied the 6, into the Figures of the Multiplicand, I begin at the Figure 2, as 2 times 4 is 8, which I set even under the Figure 2, as appears by the Sum in the Margent.*

Multiplicand	56324
Multiplier	20006
	337944
	112648
	1126.817.944

VII. *In*

VII. *In this Sum is a Cypher in the Multiplicand.*

Begin thus. Saying, 9 times 8 is 72, the odd 2 I set below the Line, and I keep the 7 tens in mind.

Then 9 times 0 is 0, and the 7 I kept in mind is 7 to be set below the Line. Next, 9 times 7 is 63, set down the 3, and proceed by the 5. Example, which will be easie, if you have the Multiplication Table by heart.

```
 4708
  679
 -----
42372
32956
28248
-------
3196732
```

VIII. *How many Minutes old may a Boy that is 15 Years of Age be.*

```
Days in one Year ——— 365
Hours in a Day and Night ——— 24
                      -----
                       1460
                       730
                      -----
Hours in one Year ——— 8760
Minutes in one Hour ——— 60
                      -------
Minutes in a Year ——— 525600
15 Years the Boys Age ——— 15
                      --------
                      2628000
                      525600
                      --------
Minutes old ——— 7884000
```


☞ Whereas

☞ Whereas 365 is set for the Days in one Year, yet the *Julian* Account makes the Magnitude (or greatness) of the year to consist of 6 hours more.

Therefore I multiply 6 (by 15 years the Boys Age) and it makes 90 hours to be added to 8760, (the hours before.) According to this Account there are 8850 hours in a year.

Or more exactly, the Year consists of 365 Days, 5 Hours, 49 Minutes, 4 Seconds, and 21 Thirds, which being near 11 Minutes less than we usually account a year, causes that running back of our Festivals (so called by *H. C.*) which the Church of *Rome*, and most *European* Nations subject thereunto, have endeavoured to amend, by adding 10 Days before our Account, which is called *New-Stile*, their Twentieth being our Tenth Day of *August*.

Note also, That the beginning of the year for Law business, *&c.* is the 25th. Day of *March*, called *Lady-Day*.

IX. *How many Barly corns will reach from* London *to* Bedford, *if* 40 *Miles asunder.*

First, Multiply 8 by 40, and the Product is 320. Next, Multiply the 320 by 33, and so on.

Furlongs

Furlongs in a Mile——8
Poles in a Furlong——40

Poles in 1 Mile in length——320
Half Feet in a Pole——33

960
960

Half Feet in a Mile 10560
Inches in half a Foot——6

Inches in a Mile——63360
Barly-Corns in an Inch——3

Corns in a Mile——190080
Miles to *London*——40

Corns in 40 Miles——7.603.200

Thus read, 7 Millions, 6 Hundred and 3 Thousand, and 2 Hundred.

Suppose it was asked, How many Barly-Corns in length will reach from *London* to *York* (accounted 150 Miles) do thus.

Barly-Corns in a Mile——190080
From *London* to *York* are Miles——150

9504000
190080

Barly-Corns——28.512.000

Thus Read, 28 Millions, 512 Thousand.

X. *If one Seamen have* 14 s. *the Month Wages, What will the Wages of* 3349 *Seamen for the same time come to?*

```
  3349
    14
 -----
 13396
 3349
 -----
Shillings 46886 Answer.
```

The Answer is 46886 s, which you may reduce into Pounds by the 1st. Example in Reduction.

XI. *To prove Multiplication by a Cross,*

First, Cast away all the Nines in the Multiplicand, the remainder set on the right side the Cross; and the Nines out of the Multiplier, the remainder set the left side the Cross; then multiply these two figures together, from which Product cast away the Nines, setting the remaining figure over the Cross: Or thus, which is easier. Suppose the two figures on each side the Cross, being multiplied together, make 56, you may instead of casting away the Nines out of the 56, add them, saying, 5 and 6 is 11, cast the 9 out of the 11, rest 2 to be set over the Cross.

Lastly, Cast away the Nines from the Product, and if the figure remaining be the same which stands on the top of the Cross, then is your Sum right.

Note,

Note, The Casting away Nines is thus, The Product of Shillings in the last Example, is 46886. Do thus, Saying, 4 and 6 is 10, cast away the 9 rests 1, then 2 and 8 is 10, cast away 9, rests 1. Then 1 and 8 is 9, cast it away. Lastly, 6 is the remainder, *&c.*

Or rather, Divide the Product by the Multiplicand, or Multiplier, and the Quotient will be one of them, this last, when you have learned the next Rule.

DIVISION.

In *Division*, as in *Multiplication*, there are three Terms to be kept in Memory, that is to say, The *Dividend*, the *Divisor*, and the *Quotient*, which will plainer appear, by the following

Example, *Let* 576 l. *be divided among* 4 *Men, the two Numbers are thus placed.*

Dividend——576 (Quotient.
Divisor——4

By the placing of the figures, it appears, that the biggest number (which is always the highest) is called, *Dividend*, the figure 4 is Divisor, and those figures that shall be within the Crooked Line, are called the Quotient.

For the exact dividing 576 *l.* among 4 Men, do thus. Say, How many times 4 can be had in the figure 5, one time, therefore set 1 within the Crooked Line, or Quotient, and say, once 4 is 4, take 4 from 5, rests 1, which set above the 5, and Cancel, or dash with the Pen the 4 and 5, and the Sum stands as in the Margent.

1
576 (1
4

Next,

Next, remove the Divisor 4 one place further, that is, under the 7, and say, How many times 4 can be had in 17, but 4 times, therefore set 4 in the Quotient, and say, 4 times 4 is 16, take 16 from 17, rests 1, which 1 set over the 7, and Cancel the 17, and 4 the Divisor, and the work stands as in the Margent.

```
 11
576 ( 14
 44
```

Lastly, remove the Divisor 4 under the 6, and say, How many times 4 can be had in 16, just 4, therefore set another 4 in the Quotient, and say, 4 times 4 is 16, take 16 from 16, rests none; therefore when 576 *l.* is divided amongst 4, each Man is to have 144 *l.* which you may prove by multiplying the Quotient 144 by 4 the Divisor, so is the Product equal to the Dividend. Example thereof is in the Margent.

```
 11
576 ( 144
444
```

```
 11
546 ( 144
444     4
        ---
        546
```

II. *In one Year are 365 Days, divide by 7 to know how many Weeks, set thus,*

```
365 (
  7
```

But when the first figure of the Dividend happens to be less than that of the Divisor, then you must set the Divisor more forwards to the right hand under the *Second* figure of the Dividend, thus.

```
365 (
  7
```

Then say, How often can I have seven in 36? By the Multiplication Table you have learnt, that 6 times 7 is 42, which is 6 oo much; but 5 times 7 is 35, therefore I say, I

can

can have it 5 times, which I note in a crooked line drawn on the right side of the Dividend; and say 5 times 7 is 35, now 35 out of 36, there remains one, which I write over the 6, and with a dash Cancel both the 7 (as having perform'd its first office) and the 5, as may be seen in the Margent.

```
 1
365( 5
 7
```

Lastly, I must remove my Divisor 7, farther, and say, How oft can I have 7 in 15? Which being twice, I set 2 in the Quotient, and say, 2 times 7 is 14, take 14 from 15, rests 1, which I write over the 5, and with a crooked line distinguish it to be a Remainder, so that in 365 Days, there are 52 Weeks, and 1 Day over, as by the remainder appeareth.

```
 1( 1
36~5(52
 77
```

III. *When you divide any number by* 10, 100, 1000, *&c. you need work but by the Figure* 1, *setting all the Cyphers next the Quotient.*

```
87960(8796
11110(
```

As suppose I divide 87960 by 10, I first set the Cypher, and then divide by 1.

The same is to be observed if you are to divide any number by 20, 200, 2000, *&c.*

```
 1(1
179(20 (89
 2200
```

Suppose I Divide 17920 by 200, first set the 2 Cyphers next the Quotient, and divide only by the figure 2, the same

same may be oserved if you divide by 30, 40, 500, 16000, &c.

☞ The Directions before, I hope are sufficient to give the Learner understanding, how to divide any number by one figure, and for practice, take the 4 Sums following, divided by a single figure.

```
 488                    4
40734 ( 6798           82958 ( 4708
 6866                   7777

    Remainder.              Remainder.
 1232 (2                 12 (2
947086 ( 236771         370894 ( 92723
444444                   44444      4
                        ----------------
                   Proof------370894
                        ----------------
```

IV. *Let* 20736 l. *be Divided amongst* 12 *Men.*

I set the Sum thus

```
20736 (
12
```

First, I say, How oft can I have 1 in the figure 2 over it? I take but one (the reason you may know hereafter) therefore I set 1 in the quotient, and say, once 1 is 1, take one from 2, rests 1 to set over the 2, and cancel the 2 and the Divisor 1.

Next, 1 in the quotient, and 2 the part of the Divisor, as once 2 is 2, take 2 from the 10 above, rests 8, to be set

```
18
20736 ( 1
12
```

over

over the 0, and cancel the 10 and the 2 below, and the Divisor is once wrought.

Again, I remove the Divisor 12 one place further, saying, How oft can I have 1 in the figure 8? I am to take but 7 times (for if I had said 8, then I could not take 8 times 2 out of 7.) Therefore I set 7 in the quotient, to be multiplied into 12 the Divisor several as before) thus.

```
 13
 18
20736 ( 17
 122
  1
```

Saying 7 times 1 is 7, take 7 from 8, rests 1. Then 7 times 2 is 14, take 14 from 17, rests 3, which set over the 7, and cancel the 17, and the Divisor 12, and there is 336 uncancelled, as you may see in the Margent.

Again, I remove the Divisor 12 one place further. Saying, How oft can I have 1 in the 3 above? Twice. Therefore I set 2 in the quotient, and say, 2 times 1 is 2, take 2 from 3 rests 1, which I set over the 3 and cancel the 3. Next, two times 2 is 4, take 4 from 13 above, rests 9, which 9 I set over the 3 and cancel the 13, and Divisor 12.

```
 11
1839
20736 ( 172
 1222
  11
```

Lastly, I remove the Divisor 12, which fills up the places to the quotient, and say, How oft can I have 1 in the Nine above, 8 times; therefore I set 8 in the quotient, and say, 8 times 1 is 8, take 8 from 9, rests 1 to set over the 9, and cancel the 9. Next, 8 times 2 is 16, take 16 from 16, rests 0. So that if 20736 *l.* be divided amongst 12 Men, each Man is to have 1728 *l.* the Answer.

```
 111
1839
20736 ( 1728
 12222
  111
```

V. *Let 4684 l. be equally divided between 54 Men.*

I set down thus

```
4684(
54
```

But because I find that that 5 of the Divisor is greater than the 4 over it, I remove it, a place further, thus.

Saying, How oft can I have 5 in 46 nine times, and one remaining, but then I cannot have nine times 4 (the other figure of the Divisor) that is 36, out of 18, therefore I take but 8 times 5, and having set 8 in the place for the quotient, I say 8 times 5 is 40, take 40 from 46, cancel the 4, and the 6 remains.

```
35
4684(8
54
```

Next 8 times 4 is 32, take 32 from 38 rest 6, which set over the 8 and cancel the 8, and 364 remains uncancelled, the Divisor 54 being once wrought, as in the Margent.

```
(86
4684(8
54
```

Again, I remove the Divisor 54, and say, How oft can I have 5 in 36? The Answer is 7 times and one remaining; but withal consider I cannot take 7 times 4 which is 28, out of 14, which then would only remain; therefore I take but 6 for the quotient, which I set down in its place, and say, six times 5 is 30, there remains 6; so I cancel the 3 and the 5 in the Divisor.

Lastly, I say 6 times 4 is 24, which take out of 64, there remains 40, which hook in for the Remainder.

Hereby

(4 Remainder.
36(0
4684 (86
544
8

Hereby I learn, that 4684 *l.* being to be equally distributed amongst 54 Men, each Man's share is 86 *l.* and there remains 40 *l.* over, to be shared amongst them.

VI. *How to share the odd* 40 l. *amongst the* 54 *Men.*

Reduce it into Farthings thus: Multiply 960 (the Farthings in 20 *s.*) by 40 *l.* and the Product gives 38400 Farthings, which divide by 54 (as before) and the quotient gives 711 $\frac{6}{54}$ Farthings for each Man.

VII. *Then to Reduce the said* 711 *Farthings into Pence, divide them by* 4 (*because* 4 q. *is* 1 d.) *and the Quotient gives* 117 d, *which divide by* 12 (*the Pence in* 1 s.) *the Quotient gives* 14 s.

Example.

Farthings in 20 *s.* 960
40 *l.*
Farthings——38400

11
266(6
38400 (711 $\frac{6}{54}$ Farth.
5444
88

33(3 q.
711 (177 $\frac{3}{4}$ Pence
444

x
5(9 d. (
177
122

s. d. q.
14—9—3 $\frac{6}{54}$

So that each Man is to have 86 *l.*--14 *s.*--9 *d.*--3 *q.* $\frac{6}{54}$

VIII.

VIII. *In* 42952 *Square Poles or Perches of Land, How many Acres, Roods, and Poles?*

This Example may be for the finishing of the V. Example in Multiplication, which number of Square Poles, (or any other) may be reduced into Acres, by dividing them by 160 (because so many is in one Acre, the Sum to be set

thus——42952(
16 0

The Cypher of the 160, being set next the quotient as is shewed in the I. Example before, so I divide as by 16 only.

Saying, How oft can I have 1 in 4? I must have but two times (for the same reason as is shewed in the V. Example before, against this ☞.)

Therefore I set 2 in the quotient, and say, 2 times 1 is 2, take 2 from 4, rests 2 to be set over the 4 and 1, both which I have cancelled with a dash. Next, 2 times 6 is 12, take 2 of the 12 from 2, rest 0, and the 1 of the 12 from 2, rests 1, which is set over the 2, and there remains 10 over the Cancelled figures, as you may see above.

1
20
42952(2
16 0

☞ If your Sums be *long*, you must take special care to write your figures *even* in their places, over and under each other, else you will bring all into confusion.

Secondly, I remove the Divisor 16 one place further, saying, How oft can I have 1 in the 10 above, only 6 times, so I set 6 in the quotient and say, 6 times 1 is 6, take 6 from 10, rests 4, which I set over the 0, and cancel the 10 and 1.

```
 1
14
203
4298 2 ( 26
166 0
 1
```

Then 6 times 6 is 36, take 6 of it from 9, rests 3 to stand over the 9, which I cancel, then take 3 of the 36 from 4, rests 1, so that there remains uncancelled in the Sum, above 1352.

Thirdly, I remove the Divisor 16 one place further, saying, How oft can I have 1 in 13? but 8 times; therefore say, 8 times 1 is 8, take 8 from 13, rests 5, to be set over the 3; and I cancel the 13.

Lastly, 8 times 6 is 48, take 8 thereof from 5, that is over it, but that I cannot therefore (as in Subtraction) I borrow 10 to add to the 5, makes 15, then take 8 of the 48 from 15, rests 7 to stand over the 5, then the one that I borrowed, and 4 of the 40 makes 5, take 5 from the uppermost 5, rests nothing, only there remains 72 Poles, which I divide by 40 (the Poles in a Rood) thus,

```
 1
14 8
203 (7
4298 (2 ( 268
16880
 11
```

```
(3 p.
7 (2 ( 1 Roo d.
40
```

	A.	R.	P.	
In all	268	1	32	Answer.

See IX. Example in Reduction.

IX. *If* 7306242 l. *are to be equally Levied upon* 9034 *Parishes, How much must each Parish pay?*

Divide the Pounds by the Parishes, and the quotient gives the Pounds every Parish must contribute,

The Sum set thus 7306242 (
9034

Then I say, How oft can I have 9 in 73, I find 8 times, which 8 I set in the quotient, and say, 8 times 9 is 72, which taken out of 73, there rests 1, which write over 3, and cancel both the 3 and 7, and also the 9 in the Divisor. Again, I say 8 times 0 is 0, which take out of 0, still 0 remains. Then I say, 8 times 3 is 24, 4 out of 6, and there remains 2, which I set over-head, and Cancel the 6; but the 2 of the 24 out of 0 I cannot, but having 1 towards the left hand in the Dividend, I borrow it, the place of 0 must be accounted 10, so I say, 2 out of 10 there remains 8, which I set over the place of 0, and Cancel 0; and because I must pay what I borrowed, I say, 1 I borrowed out of 1 and there remains nothing, so I Cancel the 1, and also the 3 in the Divisor, and proceed to the last figure of the Divisor, saying, 8 times 4 is 32, now 2 out of 2 and there remains 0, which I set over 2, but then 3 (of the 32) out of the figure 2 that's over the 6 I cannot, so I borrow one, 10 to the 2 makes 12 and say, 3 out of 12, there rests 9, which I set above and Cancel the 2; then one that I borrowed

79
1820
7306242 (8
9034

out of 8 there rests 7, which I put over head and Cancel the 8, and the Work stands as above, where you may see that 79042 is still undivided.

```
79
1820
7906242 ( 8
 90344
  9033
```

Again, having removed the Divisor 9034 one place further, but seeing I cannot take 9 out of the 7 above, in all such cases, I am to put a Cypher in the quotient, and remove the Divisor one place further, which in this Example, fills up the places.

Then say, How many times 9 in 79? The Answer is 8, so I put 8 in the quotient, and say, 8 times 9 is 72, which out of 79 there rests 7, which I write over the 9, and Cancel both that, and the 9 in the Divisor.

```
(6
 7(7
 798(7
 18200(0
 7306142 ( 808
  903444
  90333
   90
```

Then 8 times 0 is 0, and so I let the 0 in the Dividend stand, but cancel that of the Divisor. Then 8 times 3 is 24, now 4 out of 4 there rests 0, which I write over 4, and Cancel the 4, but the 2 of the 24 out of 0 I cannot, therefore I borrow 10, then take 2 from 10, rests 8 to stand over the 0, and cancel the 0, then the 1 that I borrowed out of 7, there rests 6, which I write over 7, and cancel the 7, as also 3 the Divisor.

Lastly, 8 times 4 is 32, take 2 of the 32, from 2 rests 0, which I write over 2, and Cancel the 2, but the 3 of the 32 out of 0 (that stands over 4) I cannot, therefore borrow 10, and take 3 from 10, rests 7, which I write over 0, and the 1 that I borrowed out of 8 rest 7, which I set over 8, and cancel the 8, and the 0 in the Dividend, as also 4 in the Divisor.

So

So that I find every Parish must contribute 808 *l.* and 6770 *l.* over, to be also equally divided amongst them, which 6770 *l.* if you turn into Shillings by Multiplying it by 20, it makes 135400 *s.* which divided by 9034, makes the quotient 14 *s.* which is so much on each Parish more, and 8944 *s.* remaining, which you may turn into Pence, by multiplying by 12, and divide by 9034, as before, the quotient will tell you how many Pence falls to each Parishes share, *&c.*

X. *If the King's Revenue comes to* 250000 l. *by the Year, How much comes it to by the Week?*

Divide by 52 the Days in a Year.

```
   (3
 4245(6
250000 (
52222
 888
```

4807 *l.* by the Week, and $\frac{35}{52}$ the parts of a pound. See Vulgar Fractions.

XI. *A Penny idly spent, might buy a Yard square of Land, after the Rate of* 20 l. *the Acre.*

Example:

```
                (3
Feet in an Acre—435(60 (
Pence in 20 pound—4800
```

9 Feet Answer.

XII. *Proof of Division by a Croſs.*

Dividend——42852
Diviſor——160
Quotient——267
Remainder——132

Firſt, Caſt away the Nines out of the Dividend, and ſet the Remainder (which in this Example is 3) over the Croſs.

Secondly, Caſt away the Nines out of the Diviſor (if any) and the odd under or more than 9 ſet at one ſide the Croſs, which in this is 7.

Thirdly, Do ſo for the Quotient, and the Remainder is 6, which ſet on the other ſide the Croſs.

Laſtly, Multiply the figure on each ſide the Croſs as 7 by 6, which make 42, to which add the Remainder 132 thus, Saying 4 and 2 is 6, and 1 is 7, and 3 is 10, and 2 is 12, of which the odd above 9 is 3, which ſet under the Croſs, and if this laſt Remainder be the ſame with that which ſtands over the Croſs, the Work may be right, otherwiſe not.

But Diviſion is beſt proved by Multiplication, for if you multiply the Quotient by the Diviſor, the Product and Remainder (if any) will be equal to the Dividend.

Example.

Example.

```
                 1
                13
               252
Dividend———8760 ( 365 Quotient.
Divisor———2444 ( 24 Divisor.
               22
               ————
                1460
                730
               ————
Product———8760 Dividend.
               ————
```

Note, That the last Sum in the 3d Example is proved with a Remainder.

RE-

REDUCTION.

Reduction is wrought by the foregoing Rules; for any greater *Name* is turned into a *Lesser* by *Multiplication.*

For if you Multiply Pounds in Money by 20, the Product is Shillings; or Shillings by 12, the Product is Pence; or Pence by 4, the Product is Farthings, see the VI. Example in Division.

Any lesser *Name* is turned into a *greater*, by Division; for if you divide Shillings by 20, the quotient is Pounds, or Pence by 12, the Product is Shillings, or Farthings by 4, the Quotient is Pence.

I. *In* 896 l. *How many* Shillings, *Pence, and Farthings?*

	l. 896
	20
Shillings——	17920
	12
	35840
	17920
Pence——	215040
	4
Farthings——	860160

II. *In* 860160 *Farthings, How many Pence, Shillings, and Pounds?*

Pence

860160 (215040
444444

1
22
1912
215040 (17920
122222
1111

11
17920 (896 Pound.
2220

Re-

Reduction of Coyn.

III. *In* 798 l. *How many Nobles, Marks, Crowns, Shillings, Pence, and Farthings?*

	l.
	798
Nobles in 20 Shillings—	3
Nobles in all—	2394

	l.
	798
Crowns in 20 Shillings—	4
Crowns in all—	3192
Shillings in a Crown—	5
Shillings in all—	15960
	12
	31920
	15960
Pence—	191520
	4
Farthings—	766080

11 Marks.
2394 (1197
2222

Here I divided the Nobles by 2, and the quotient is Marks, for 6 *s.*——8 *d.* is a Noble, 13 *s.*——4 *d.* is a Mark.

IV. *In*

IV. *In* 3844 *Dollers of* 4 s.——8 d. *the piece, and* 16 d, *odd money, How many* French *Crowns of* 6 s. *the piece? And also, how many Pounds* English?

Dollers—3844
Pence in 1 Doller—56

23064
19220(6
(1*d*

Pence—215280

To the Product I have added the 16 *d.* odd Money.

x
22
1914 Shillings.
215280(17940
xxxxxx
xxxx

ss French Crowns.
17940(2990
6666

xx l.
17940(897 *English.*
2220

Reduction

Reduction of Dry Measure.

V. *In* 8796 *Lasts, how many Quarters, Bushels, and Pecks?*

Lasts	8796
	10
Quarters	87960
	8
Bushels	703680
	4
Pecks	2814720

VI. *In* 2814720 *Pecks, how many Bushels, Quarters, and Lasts?*

27 Bushels.
2814720 (703680
444444

674 Quarters.
703680 (87960
88888

Lasts.
87960 (8796
11110

Reduction

Reduction of Liquid Measure.

VII. *In* 896 *Tuns, how many Hogsheads, Gallons, and Pints?*

Tuns	896
	4
Hogsheads	3584
	63
	10752
	21504
Gallons	225792
	8
Tuns	1806336

VIII. *In* 1806336 *Pints, How many Gallons, Hogsheads, and Tuns?*

247r
1806336 (225792 Gallons.
888888

2
3841
4625
225792 (3584 Hogsheads.
63333
668

72
3584 (896 Tuns.
444

Redu-

Reduction of Land Measure.

IX. *In 32 Acres, 3 Rood and 27 Pole, how many Pole?*

A.	R.	P.
32	3	27
160	40	
1920	120	
32		
5120 Product.		
120 } Poles added.		
27 }		
5267 Poles in all, Answer.		

See the V. Example in Multiplication, and 8 of Division before.

X. *In 5267 Poles, how many Acres, Roods, and Poles?*

```
 (1
 (2
24(4
328(7 (
1880   (  32 Acres.
 1

 (2
 14(7 (  3 Roods.
   40
```

	Acres.	*Roods.*	*Poles.*
Answer,	32	3	27

Note, That if you mind the several Denominations, or parts, you may Reduce all sorts of Weights and Measures backwards and forwards.

Reduction of Averdupois *Weight.*

XI. *In 36 Barrels of Figs, each* $3\frac{1}{4}$ C. *Gross, Tare* 19 ℔. *the Barrel, how many Pounds neat?*

B.	℔.	*B.*
If 1 gives 19, what will 36 give?		
		19
		324
		36
		684 Tare in all.
		C. $3\frac{1}{4}$
		4
The $\frac{1}{4}$ C. added		13
℔'s in $\frac{1}{4}$ of a C.		28
		104
		26
℔'s in 1 Barrel		364
Barrels in all		36
		2184
		1092
℔'s Gross		13104
℔'s Tare		684
℔'s Neat		12420

In this Example, I multiplied the 3 hundred, by 4 the Quarters of an hundred, adding to the Product, the quarter, and it makes 13 quarters, which I again multiply by 28, (the ℔'s in a $\frac{1}{4}$ C.) and the quotient gives the Pounds in one Barrel, &c. A

A Table directing, how to buy and sell by the Hundred.

d.q.	l. s. d.	d. q	l. s. d.	d. q.	l. s. d.
0.1	0. 2.4	8.1	2.17.0	16.1	7.11.8
0.2	0. 4.8	8.2	3.19.4	16.2	7.14.0
0.3	0. 7.0	8.3	4. 1.8	16.3	7.16.4
1.0	0. 9.4	9.0	4. 4.0	17.0	7.18.8
1.1	0.11.8	9.1	4. 6.4	17.1	8. 1.0
1.2	0.14.0	9.2	4. 8.8	17.2	8. 3.4
1.3	0.16.4	9.3	4.11.0	17.3	8. 5.8
2.0	0.18.8	10.0	4.13.4	18.0	8. 8.0
	1.0	10.1	4.15.8	18.1	8.10.4
2	1. 3.4	10.2	4.18.0	18.2	8.12.8
2.3	1. 5.8	10.3	5. 0.4	18.3	8.15.0
3.0	1. 8.0	11.0	5. 2.8	19.0	8.17.4
3.1	1.10.4	11.1	5. 5.0	19.1	8.19.8
3.2	1.12.8	11.2	5. 7.4	19.2	9. 2.0
3.3	1.15.0	11.3	5. 9.8	19.3	9. 4.4
4.0	1.17.4	12.0	5.12.0	20.0	9. 6.8
4.1	1.19.8	12.1	5.14.4	20.1	9. 9.0
4.2	2. 2.0	12.2	5.16.8	20.2	9.11.4
4.3	2. 4.4	12.3	5.19.0	20.3	9.13.8
5.0	2. 6.8	13.0	6. 1.4	21.0	9.16.0
5.1	2. 9.0	13.1	6. 3.8	21.1	9.18.4
5.2	2.11.4	13.2	6. 6.0	21.2	10. 0.8
5.3	2.13.8	13.3	6. 8.4	21.3	10. 3.0
6.0	2.16.0	14.0	6.10.8	22.0	10. 5.4
6.1	2.18.4	14.1	6.13.0	22.1	10. 7.8
6.2	3. 0.8	14.2	6.15.4	22.2	10.10.0
6.3	3. 3.0	14.3	6.17.8	22.3	10.12.4
7.0	3. 5.4	15.0	7. 0.0	23.0	10 14.8
7.1	3. 7.8	15.1	7. 2.4	23.1	10.17.0
7.2	3.10.0	15.2	7. 4.8	23.2	10.19.4
7.3	3.12.4	15.3	7. 7.0	23.3	11. 1.8
8.0	3.14.8	16.0	7. 9.4	24.0	11 4.0

The use of this Table.

If you buy any thing by the hundred, accounting 112 Pounds to the Hundred, and would know by the Pound what the Hundred is valued at.

Example.

If you buy Goods at 4 Pence 3 Farthings the Pound.

Look in the Table for 4 *d.* 3 *q.* in the first Column, and against it in the second Column, you find 2 *l.*—4 *s.*—4 *d.* and so much at that rate 112 pound comes to.

Example 2.

If 1 C. weight, that is 112 pound, cost 4 pound one Shilling 8 Pence, to know how much it is by the Pound, look 4 *l.*—1 *s.*—8 *d.* in the fourth Column of the Table, and right against in the Column next the left hand you may find 8 *d.*—3 Farthings, and so much at that rate it comes to by the Pound.

Again, If you buy one hundred weight of Goods for 4 Pounds 1 Shilling 8 Pence, and retail it at 10 Pence the Pound, it comes to at that Rate, 4 *l.*——13 *s.*——4 *d.* take 4 *l.*——1 *s.*——8 *d.* from it, and you will find your self by the Remainder 11 *s.*——8 *d.* gainer, *&c.* See the 5 and 6 Question in the *Golden Rule.*

Example

Example XII. *Of Tare, Tret, and Subtle Weight.*

Suppose 3 Chests of Sugar marked *A, B, C,* the Gross Weight of each is as followeth.

	C.	q.	℔.
A.	09	3	25
B.	10	1	16
C.	08	2	21
The Total Gross Weight is	29	0	06

Now supposing the Tare (or Weight of each Chest when it is empty) is 42 ℔. What neat weight of Sugar will remain, when the Tare is Subtracted?

From	29	0	06	The Total Gross weight.
Take	1	0	14	The Sum of the Tare.
Rest	27	3	20	the Neat weight of Sugar.

Tare, is the allowance for the weight of the Chest, Bag, *&c.* wherein any Commodity is put.

Tret, is an allowance of 4 ℔. to every 100 ℔. that is, 104 for 100.

2. *Example.*

In 75 C.——3 qr.——13 ℔. Tare 11 ℔ *per C.* Tret, 4 ℔. *per C.* How many Pounds Neat?

C. q. ℔.
75—3—13
4 quarters in 1 C.

303
28 ℔'s in a ¼ C.

2437
606

8497 ℔'s Gross.
Tare 833 Subtract.

℔'s 7664 Subtle.

C.
75
Tare —11 ℔. *per C.*

75
Tare 75(8 for 3 q. 13 ℔.

Tare 833 in all.

Having 7664 the Pounds Subtle to find the Pounds Neat, because out of 104 ℔. you are to Subtract 4 ℔, you may Subtract 1 out of 26 ℔ instead thereof. Therefore, divide the number of Pounds Subtle by 26, and the Quotient shall be the Tret, which Subtract out of the Pounds Subtle, so shall the Pounds Neat remain.

r
26(2
342(0
7664
2668
22

294—
26

20 ℔ Tret.

7664 ℔'s Subtle.
294 Tret Subtract.

7370 ℔'s neat remain.

Note, That the Pounds Subtle are those that remain after the Tare (or waste) is Subtracted, out of which ℔'s Subtle, you Subtract the ℔'s Tret, as before.

A Table

A Table of the Assize of Bread, according to Troy *Weight, having* 12 *Ounces in a Pound, and* 20 *Penny-weights in each of these* 12 *Ounces.*

Price of Wheat.	Penny White.	Penny Wheaten	Penny Houshold
s. d.	℔ou. dw	℔ou. dw	℔ou dw
19.6	1. 5. 7	2. 2. 0	2.10.19
20.0	1. 4.18	2. 1. 6	2. 9.16
20.6	1. 4.10	2. 0.14	2. 9. 0
21.0	1. 4. 2	2. 0. 2	2. 8. 4
21.6	1. 3.14	1.11.12	2. 7. 8
22.0	1. 3. 0	1.11. 0	2. 6.12
22.6	1. 3. 6	1.10.10	2. 6. 0
23.0	1. 2. 4	1.10. 0	2. 5. 8
23.6	1. 2. 8	1. 9.12	2. 4.16
24.0	1. 2. 2	1. 9. 2	2. 4. 4
24.6	1. 1.16	1. 8.13	2. 3.12
25.0	1. 1.10	1. 8. 6	2. 3. 0
25.6	1. 1. 5	1. 7.18	2. 2.10
26.0	1. 1. 0	1. 7.10	2. 2. 0
26.6	1. 0.15	1. 7. 3	2. 1.10
27.0	1. 0.10	1. 6.16	2. 1. 1
27.6	1. 0. 6	1. 6. 8	2. 0.12
28.0	1. 0. 1	1. 6. 0	2. 0. 2
28.6	0.11.17	1. 5.15	1.11.14
29.0	0.11.13	1. 5.10	1.11. 6
29.6	0.11. 9	1. 5. 4	1.10.17
30.0	0.11. 5	1. 4.18	1.10.10
30.6	0.11. 1	1. 4.12	1.10. 2
31.0	0.10.18	1. 4. 6	1. 9.16
31.6	0.10.14	1. 4. 1	1. 9. 8
32.0	0.10.11	1. 3.16	1. 9. 2
32.6	0.10. 8	1. 3.12	1. 8.16

Price

Price of Wheat	Penny White.	Penny Wheaten	Penny Houshold
s. d	lb. u. dw	lb. u. dw	lb. u. dw
33.0	0.10. 5	1. 3. 6	1. 8.10
33.6	0.10. 3	1. 3. 0	1. 8. 4
34.0	0. 9.19	1. 2.15	1. 7.18
34.6	0. 9.16	1. 2.12	1. 7.12
35.0	0. 9.13	1. 2. 8	1. 7. 6
35.6	0. 9.10	1. 2. 4	1. 7. 0
36.0	0. 9. 8	1. 2. 1	1. 6.16
36.6	0. 9. 5	1. 1.18	1. 6.10
37.0	0. 9. 2	1. 1.14	1. 6. 4
37.6	0. 9. 0	1. 1.10	1. 6. 0
38.0	0. 8.18	1. 1. 7	1. 5.16
38.6	0. 8.15	1. 1. 4	1. 5.11
39.0	0. 8.13	1. 1. 0	1. 5. 6
39.6	0. 8.11	1. 0.16	1. 5. 2
40.0	0. 8. 9	1. 0.12	1. 4.18
40.6	0. 8. 7	1. 0. 9	1. 4.14
41.0	0. 8. 5	1. 0. 6	1. 4.10
41.6	0. 8. 3	1. 0. 3	1. 4. 6
42.0	0. 8. 1	1. 0. 0	1. 4. 2
42.6	0. 7.19	0.11.18	1. 3.18
43.0	0. 7.17	0.11.16	1. 3.14
43.6	0. 7.15	0.11.13	1. 3.10
44.0	0. 7.13	0.11.10	1. 3. 6
44.6	0. 7.12	0.11. 6	1. 3. 5
45.0	0. 7.10	0.11. 4	1. 3. 0
45.6	0. 7. 8	0.11. 2	1. 2.17
46.0	0. 7. 6	0.11. 0	1. 2.14
46.6	0. 7. 5	0.10.18	1. 2.10
47.0	0. 7. 4	0.10.16	1. 2. 7
47.6	0. 7. 2	0.10.13	1. 2. 4
48.0	0. 7. 1	0.10.10	1. 2. 1
48.6	0. 6.19	0.10. 8	1. 1.18
49.0	0. 6.17	0.10. 6	1. 1.16
49.6	0. 6.16	0.10. 4	1. 1.13
50.0	0. 6.15	0.10. 2	1. 1.10

Price

Price of Wheat.	Penny White.	Penny Wheaten	Penny Houshold
s. d.	℔ ou. dw	℔ u. dw	℔ ou. dr.
50.6	0. 6.14	0.10. 0	1. 1.17
51.0	0. 6.12	0. 9.18	1. 1. 4
51.6	0. 6.11	0. 9.16	1. 1. 2
52.0	0. 6.10	0. 9.14	1. 1. 0
52.6	0. 6. 8	0. 9.12	1. 1.17
53.0	0. 6. 7	0. 9.10	1. 0.14
53.6	0. 6. 6	0. 9. 8	1. 0.12
54.0	0. 6. 5	0. 9. 6	1. 0.10
54.6	0. 6. 4	0. 9. 5	1. 0. 8
55.0	0. 6. 3	0. 9. 4	1. 0. 6
55.6	0. 6. 1	0. 9. 2	1. 0. 3
56.0	0. 6. 0	0. 9. 0	1. 0. 0
56.6	0. 5.19	0. 8.18	0.11.18
57.0	0. 5.18	0. 8.17	0.11.16
57.6	0. 5.17	0. 8.15	0.11.14
58.0	0. 5.16	0. 8.14	0.11.11
58.6	0. 5.14	0. 8.13	0.11. 9
59.0	0. 5.13	0. 8.12	0.11. 6
59.6	0. 5.12	0. 8.10	0.11. 4
60.0	0. 5.11	0. 8. 8	0.11. 2
60.6	0. 5.10	0. 8. 6	0.11. 1

The use of the Table of the Assise of Bread.

Bakers Inhabiting Corporate Towns (in regard that they pay Scot and Lot) are allowed 6 Shillings in every Quarter of the middle prized Wheat, for their charge in Baking.

And Country, or Forreign Bakers only 4 Shillings.

Example.

Example.

When the middle price of Wheat is 30 Shillings the Quarter, for Assize of Town Bakers you are to find in the foregoing Table the Assize of Bread Answering 36 Shillings.

But for the Assize of Foreign Bakers, that of 34 Shillings; and therefore (in that case) the Penny White Loaf put to sale by Town Bakers, ought to weigh nine ounces, eight penny weights, but that uttered by Foreign Bakers, nine ounces, nineteen penny weights, as appears by the Table. See *Wingate*'s Abridgment of all the Statutes, printed Anno 1689.

Note, That Liquors, Jewels, Amber, Gold and Silver are weighed by *Troy* weight, as well as Bread, and Meal, for a Bushel of Meal weighs 68 *Pounds*, 1 *Ounce*, and 12 *Penny weight*, a Gallon of Wheaten Meal 8 Pound 6 Ounces, and 4 penny weights.

A Miller, if he carry and re-carry his Grist, is allowed 4 Pound or Pints in the Bushel, both for Toll and Waste.

But if it be brought to him, and carried back at the Owner's Charge, he ought to take but 2 pound in the Bushel.

The Waste in Grinding is about one Pound in the Bushel.

In 87 ½ ℔. *How many Ounces, Pennyweights, & Grains?*

87 ½ ℔.
Ounces in a ℔: 12
174
87(60u
Ounces in all—1050
20
Penny weights 21000
24
84000
42000
Grains——504000

In 504000 *Grains, Grains, How many Penny weights, Ounces, & Pounds?*

z
504000 (d w. 21000
244444.
2222
21000 (Ounces. 1050
22220
z
29(6
1050 (87 1 6/12 ℔. *Ans*
22
z

☞ That Gold is in proportion to Silver, as 12 to 1.

One Penny weight of Angel Gold is worth 4 *s.* 2 *d. ob.* of Crown Gold 3 *s.* 10 *d.* ½, and of Soveraign Gold 3 *s.* 6 *d.* ½.

One pound of pure Silver is worth 3 *l.* 4 *s.* 6 *d.* but mixt with Alloy or Copper is worth but 3 *l.*

The *Spanish*, *French*, and *Flemish* Gold is as fine as the *English*.

The *French* and *Dutch* put more Alloy in their Money than the *English*.

The Weight and Value of the most usual Foreign Coins, by our Standard.

Gold Coins.	Weight. dw.	gr.	Value. l.	s.	d.
French Pistol	4	8	0.	17.	4
French Lewis	3	14	0.	14.	4
Holland Rider	6	10	1.	4.	9
Hungarian Ducket	2	6	0.	9.	8
Spanish Pistol	4	8	0.	17.	4
Double Soveraign of *Flanders*	7	3½	1.	8.	7
Italian Pistol	4	6	0.	16.	7
Gilder of *Noremburgh*	2	3	0.	7.	1
Cuckeen of *Venice*	2	5	0.	9.	7
A *Danish* Coin with a Crown on one side of it	3	20	0.	15.	7

Silver COINS.	Weight. ou.	pw.	gr	Value. s.	d.	q.
Holland Dollar	0.	18.	5	4.	4.	0
Lyon Dollar	0.	17.	18	3.	4.	2
Duckatoon of *Flanders*	1.	0.	22	5.	4	0
Rex Dollar of the Empire	0.	18.	15	4	5.	3
Mexico Ryal	0.	17.	12	4.	4.	2
Sevil Ryal	0.	17.	12	4.	4.	3
Old Cardecue	0.	6.	3½	1.	6.	1
French Lewis	0.	17.	11	4.	4.	1
Double Milrez of *Portugal*	0.	14.	4	3.	6.	1
Single Milrez	0.	7.	2	1.	9.	0
St. *Mark* of *Venice*	0.	10.	4	2.	6.	0
Double *Dutch* Styver	0.	1.	0	0.	1.	3
Cross Dollar	0.	18.	0	4.	2.	1
Zealand Dollar	0.	13.	0	2.	7.	0
Old *Philip* Dollar	1.	2.	0	4.	0.	0
Prince of *Orange* Dollar, 1624.	0.	18.	6	4.	3.	3
Danish Dollar	0.	13.	0	2.	11.	1
Portugal Teston	0.	5.	0	1.	2.	3

Golden

Golden Rule, *or* Rule of Three *Direct.*

All Questions in this Rule of Three consist of 3 Numbers, whereof 2 are always of one Kind, or Denomination. As in this Example.

If I give 10 s. *for* 5 *Yards, What shall I give for* 15 *Yards, at the same Rate?*

Now two of these are of the same kind, (that is) the Number 5 and 15, which are both Yards, which place thus. The Doubtful Number, concerning which the Question is asked, must always be in the third place.

Now in this Question, the 15 Yards is the doubtful Number, the price of which the Question requires, place it therefore in the third place.

Then seek out the other Number of the same kind, or Denomination, which must be Yards also, which in this Question, is 5, set this in the first place, and then the other Number (that is 10 s.) will consequently claim the second place, and the Answer to the Question will always be of the same Denomination with it (that is) Shillings.

Now the Question stated according to the foregoing Rules, stands thus.

I. *If 5 Yards cost* 10 s. *what will* 15 *Yards cost?*

10

150 Product.

150 (30 s. Answer.
88

☞ Note, That the Questions in this Rule consist of three Numbers (as aforesaid) which in the last question, is 5, 10, 15, where you may see,

That the Second and Third (or the third and second, which is all one) are Multiplied together, and the Product divided by the first Number gives the Answer.

Proof of the last question.

II. *What shall I pay for* 5 *Yards, when* 15 *Yards is sold for* 30 *Shillings?*

If 15 Yards cost 30 *s.* What will 5 Yards cost?

30

150 Product.

150 (10 *s.* Answer.
155
1

III. If

III. *If* 1 *Bushel cost* 42 d. *what will* 80 *Bushels cost?*

80
3360 Pence.

1
1900
3360 (280 *s.*
1222
11

280 (14 *l.* Answer.
220

Note, That in this Example, the first Number (or place) was 1, (which will neither Multiply, nor Divide.) Therefore I Multiplied the number of Bushels, by 42 *d*, and the Answer is 3360 Pence, which is Reduced into Pounds by dividing by 12, and 20, as in Reduction.

Proof of the last Example.

IV. *If* 80 *Bushels, cost* 280 *Shillings, what will* 3 *Bushels cost?*

280
3
840

8(40
8 0 0 (10 *s.* Answer.
8

But the Remainder 40, and the Divisor 80, set thus $\frac{40}{80}$, now because 40 here is the half of 80, the Answer is 10 Shillings and half a Shilling.

V. *If* 1 ℔. *of Sugar cost* 14 q. *what will* 885 ℔. *cost?*

```
  885
   14
 ----
 3540
 885
 ----
12390 Farthings.
```

The Farthings Reduce into pounds by the 2d. Example in Reduction.

VI. *If* 885 ℔. *of Sugar cost* 12390 q. *what will* 3 ℔. *cost?*

```
12390 q.
    3
 -----
37170
```

```
 1
17
591
37170 (42 q
 8858
  88
```

```
4(2 q. 7 10 d. 2 q. Answer.
4 4
```

VII. *If* 1 ℔. *of Leather cost* 7 ½ d. *what will* 2 ½ C. *cost?*

7 *d.* half penny reduced into Farthings, make 30 *q.* and the 2 hundred and half reduced into pounds, by the 11. Example in Reduction, make 280 ℔. Then

If 1 ℔. cost 30 *q.* What will 280 ℔. cost?

```
  30
 ----
Farthings 8,400
```

Which Reduce into Pounds by the 2d. Example in Reduction.

VIII.

VIII. *If a Chaldren of Coals (or 32 Bushel) cost 22 s. what will one Bushel cost?*

Reduce the 22 *s.* into Pence by the 1st. Example in Reduction, make 264 *d.* which divide by 32, thus,

```
 2(8     8
264 (   8—
 32      32 d. the Bushel the Answer.
```

That is, 8 *d.* one Farthing, the Fraction $\frac{8}{32}$ is 2 Farthing, because 8 is the quarter of 32. See Vulgar Fractions.

IX. *If* 112 ℔. *of Tobacco cost* 400 d. *what will* 1 ℔. *cost?*

```
   (6
 17(4
 400 (   3 d. 64
 112          112.
```

That is, 3 *d.* and a little more than half a penny the Pound. See the Table of Prices in Reduction.

XII. *If I paid* 432 l. *for* 525 *Quarter of Malt, what is the price of one Quarter after that rate?*

Which being stated, stands thus,

Qu. ℔. *Qu.*
If 525 cost 432 what will 1 cost?

V. *If* 3720 l. *be Lent for* 5 *Months, how much ought I to lend him for a Year, or* 12 *Months, being Proof to the last Question?*

l.	*Months.*	*Months.*
3720	5	12
5		
18600		

x
61
18600 (1550 *l.* Answer.
xxxxx
xxx

VI. *If* 2 ¾ C. *weight of any Commodity cost* 3 l.---14 s.---6 d. *what will* 7 ½ C. 8 lb. *weight cost?*

Being Reduced by the foregoing Rules, stands thus,

If 308 lb. weight cost 894 *d.* what will 848 lb. cost?

Work as before directed, and afterwards Reduce your fourth number, being Pence, into Pounds by the Second Example in Reduction.

Numeration

Numeratian of Vulgar Fractions.

Numeration is nothing else, but the way of Writing and Reading *Fractions*.

And that this may be done, we must consider, That an Unite or 1, may be broken into any Number of parts representing an Unite, which parts are ctlled the Denominator of the Fraction, which is always placed below the Line; the Number or Figure above the Line, is called the Numerator, and shews how many of those parts are taken.

As for Example.

If you were to set down 16 *s.* which may be the Fraction of 1 *l.* If you divide this 1 *l.* into 20 parts, then will the Fraction stand thus, — 16 Numerator. / 20 Denominator.

If into ten parts, thus; $\frac{8}{10}$ *l.*

If into 5 parts, thus, $\frac{4}{5}$ *l.* which is 4 fifth of 20 *s.* or a Pound.

As $\frac{1}{2}$ is one half, $\frac{2}{3}$ is two thirds, $\frac{1}{4}$ is one quarter, $\frac{3}{4}$ is three quarters, $\frac{1}{6}$ is one sixth, $\frac{3}{10}$ is three tenths of any thing.

To Reduce Vulgar Fractions into their known parts.

To Reduce $\frac{5}{6}$ *s.* that is, 5 sixths of a Shilling, or 12 *d.* Multiply the Numerator 5, by the known parts of a Shilling, as 12 *d.* and divide that Product by the Denominator 6, and the Quotient gives the value of the Fraction in its known parts.

Example I.

What $\frac{5}{6}$ *s.* of 12 *d*?

```
   12 d
    5
  ----
   60      60 (10 d the value.
   60      60
```

Example 2.

What $\frac{5}{8}$ of 12 *d*?

```
   12 d
    5      (4
  ----     60 (7 4/8 d. 7 1/2 d. Answer.
   60       8
```

Example 3.

What $\frac{25}{32}$ of 20 *s*?

```
                (2
   25           13
   20           28
  ----      500 (15 20/32 Shillings.
  500        322
              8
```

The parts of a Shilling, may be Reduced as the 1st. Example.

Example 4.

Example 4.

What is $\frac{3}{8}$ of a Foot? 12 × 3 = 36 (4 ; 36 (4 ; 8) 4 $\frac{4}{8}$ Inch. or $\frac{1}{2}$ Inch.

Example 5.

What $\frac{3}{7}$ of a ℔. weight? 16 × 5 = 80 (3 ; 80 (11 ; 77) 11 $\frac{3}{7}$ Ounces.

The $\frac{3}{7}$ part of an Ounce, Reduced into Drams, Answer, 11 Ounces, 3 $\frac{3}{7}$ Drams.

Example 6.

What $\frac{3}{7}$ of an Ounce? 8 × 3 = 24 (3 ; 24 (3 ; 7) 3 $\frac{3}{7}$ Drams.

Multiplication of Vulgar Fractions.

The Rule.

Multiply all the Numerators together, the last Product shall be the Numerator of the Product required.

Likewise multiply all the Denominators together, the last Product shall be Denominator of the Product sought.

Example. 1.

Multiply $\frac{3}{5}$ by $\frac{4}{9}$ the Numerators multiplied make 12, and the Denominators 45; so that $\frac{12}{45}$ is the Product.

Example 2.

To multiply mixt numbers, let it be required to know, how many solid foot of Timber are in a stick, which is 3 foot 6 Inches one way, 3 foot 4 Inches the other, and 15 foot 9 inches in length.

The Fractions to be multiplied, stands thus, $3\frac{1}{2}$, $3\frac{1}{3}$, $15\frac{3}{4}$, which must be turned into improper fraction, thus:

Multiply the whole Numbers by the Denominators, and to the product add the Numerators respectively, which being reduced stand thus $\frac{7}{2}$ $\frac{10}{3}$ $\frac{63}{4}$.

Then say, 7 times 10 is 70, and 70 times 63 is 4410, for the Numerator.

Then say, 2 times 2 is 4, and 4 times 4 is 16, for the Denominator, and the Product is $\frac{4410}{16}$ which divide by the Denominator to know the value in a mixt number, and the Quotient will be $275\frac{10}{16}$ the number of solid feet required.

Example 3.

If a Board be $6\frac{3}{4}$ *Foot long, and* $8\frac{5}{6}$ *broad, How many Square Foot is therein?*

$6\frac{3}{4}$ foot, $8\frac{5}{6}$ foot, Reduced are $\frac{27}{4}$ $\frac{53}{6}$

24 Divisor

35

53 } Numerators.
27 }

1371 (1
106 25

143(1 (59 $\frac{15}{24}$ foot, and almost $\frac{2}{3}$
Dividend 1431 244
2

Example 4.

If a Board or Pane of Glass be 15 $\frac{3}{4}$ Inches broad, How many Inches in length of that board, will make a Foot?

15 $\frac{3}{4}$ reduced into improper Fraction is $\frac{63}{4}$.

And Divide cross ways thus—

63 X 144 In. in a f.
4 1

Dividend 576 63 Divisor.

$\frac{576}{63}$ (9 $\frac{9}{63}$ Inches in the length of that Board to make a Foot.
63

Note, That this is an Example of Division of Vulgar Fractions.

Of Decimal Fractions.

A Decimal Fraction, is an Artificial way of setting down, or expressing of Vulgar Fractions, only the Numerator only; the Denominators consisting always of an unite, or 1, with as many Cyphers joyned to it, as there are places in the Numerator, and therefore must be either, 10, 100, 1000, 10000, *&c.*

Example:

$\frac{35}{100}$	Must be thus written.	.35
$\frac{327}{1000}$		.327
$\frac{25}{1000}$		.25
$\frac{06}{100}$		.06
$\frac{64}{10000}$		0064, *&c.*

To

To Reduce Vulgar Fractions into Decimals.

The Rule.

To the Numerator of the Fraction given, add so many Cyphers, as you would have places in your Decimal Fraction; divide the Numerator of your given Fraction (the Cyphers being added) by the Denominator of the given Fraction, the Quotient will be the Decimal Fraction.

Example 1.

Reduce this Fraction $\frac{21}{112}$ into a Decimal Fraction of 4 places; to the Numerator add 4 Cyphers, thus, 210000, which divide by the Denominator 112, and the Quotient will be 1875, before which perfix a point to distinguish it from a whole number, thus, 1875, which Decimal Fraction is in value equal to $\frac{21}{112}$.

Example 2.

If $\frac{3}{4}$ be reduced into a Decimal Fraction of 4 figures (or places) it will be, 7500, or 75 for Cyphers on the right hand of a Decimal Fraction, neither Increase, nor diminish the value thereof.

Example 3.

Reduce 3 Farthings into the Decimal Fraction of a Shilling, to the 3 add 4 or 5 Cyphers, thus,

30000, which divide by 48 the Denominator (the number of Farthings in a Shilling) and the Quotient will be 625, which consists but of 3 Figures, whereas there should be 4, because there were 4 Cyphers added, therefore you must set 1 Cypher towards the left hand, and then it will be .0625. equal to the Vulgar Fraction $\frac{3}{48}$ *s.*

Example 4.

Reduce 6 *s.* or $\frac{6}{20}$ of 20 *s.* into the Decimal of a Pound, joyn a Cypher to the Numerator 6, which divide by 20 the Denominator (as is before taught) and the Quotient will be 3, the Decimal Fraction of 6 *s.*

Example 5.

Reduce 4 *d.* or $\frac{4}{240}$ *l.* into the Decimal of a pound, add 5 Cyphers to the Numerator, or more, if you would have it exact, which divide by the Denominator, and the Quotient will be 1666, to which add a Cypher, as is above directed, because there were 5 Cyphers added to the Numerator.

So 9 Inches, or $\frac{9}{12}$ reduced into the Fraction of a Foot, will be 75, which decimal Fraction signifieth $\frac{3}{4}$ of any thing (for 75 is three quarters of a 100) and therefore is the Decimal for 45 Minutes of an Hour, or 24 Gallons of a Barrel; or 2 Foot 3 Inches of a Yard; *&c.*

To

To Reduce a Decimal Fraction into the known parts of the Integar, Whether it be Coin, Weight, Measure, Time, &c.

This is the Rule.

Multiply the Decimal Fraction given, by the known parts of the next inferior Denomination of the Integer, the Product (so many Figures to the right hand being cut off, as there are places in the given Fraction) shall shew the value in that Denominator, if there yet remain any Decimal parts in the Product. Multiply them by the next lower Denomination, cutting off as many Figures as there were places in the remaining Product, *&c.*

Example 1.

Let 73251 *be a Decimal Fraction given, representing part of* 20 *s. or of a Pound Sterling.*

	.73251
	20
Shillings	14.65020
	12
	130040
	65020
Pence	7.80240
	4
Farthings	3.20960

Here the Fraction .73251 is Multiplied by 20 (because there are 20 *s.* in a pound) from which cut off 5 Figures, and the rest are Shillings, as 14 *s.* Then .65020 the Fraction of a Shilling is multiplied by .12 (because 12 *d.* is 1 *s.* and from the Product is cut off as many Figures (as above) and the 7 re-

remainiug is 7 *d.* In like manner ·80240 is reduced to Farthings. Thus this Decimal Fraction is found to be —— 14 *s.* —— 7 *d.* —— 3 *q.* $\frac{20960}{1000000}$ this Fraction .20960 being the fraction of a farthing, is not to be regarded.

Example 2.

Let 541 *be the Decimal of a Foot, be required to be reduced.*

·541	
12 Inches in a Foot.	
1082	The value of the Decimal Fraction 541, is 6 Inches, 1 quarter, and $\frac{968}{1000}$ parts, which parts make almost another quarter.
541	
6.492 Inches.	
4	
1.968 Quarters.	

Example 3.

Suppose .8965 *is the Decimal Fraction of an Hundred weight,* Averdupois, (*whose Hundred is* 112 ℔.) *which Fraction you would reduce into its known weights?*

The

The Fraction—.8965
Quarters in a Hundred 4

Quarters——3.5860
lb's in ¾ of a C.——28

46880
11726

16 Pound——16.4080
Ounces in a lb.——16

24480
4080

6 Ounces——6.5280

So the Value of the Fraction 8965. is 3 quarters, 16 pound, 6 ounces.

Example 4.

Let it be required to know how many Gallons and Pints are in .37, the Fraction of a Barrel of Ale.

The Fraction——.37
Gallons in a Barrel—32

74
111

11 Gallons——11.84
Pints in a Gallon——8
6 Pints——6.72

Answer, 11 Gallons, 6 Pints, and 72 parts, that is almost 3 quarters of a Pint.

Addition

Addition and Subtraction of Decimals.

Addition and Subtraction of Decimals, differs nothing from whole Numbers, or, which take this following Rule.

Place your Integers (or whole Numbers) and Decimal parts (or Fractions) one under another, so that the points of Separation (which distinguish the whole numbers from the Decimal parts) stand directly one under another, then add them together as whole numbers of one Denomination.

Example.

Let it be required to add these four Decimal mixt Numbers, 263.215, 168.21, 25.63905, 9.6245.

Set them thus, 263.215
168.21
25.63905
9.6245

The Total, or Sum 466.68855

An Example in Subtraction.

Let 25.63905 *be required to be subtracted from* 263. 21.

From——263.21000
Take——25.63905

The Remainder——237.57095

Multiplication

Multiplication of Decimals.

Multiply as in whole Numbers, and if there be any Decimal part, or Fraction, either in the Multiplicand, or Multiplier, or both, cut off so many figures from the Product, so shall the figures toward the right hand be the fraction of the Product, and those of the left hand the Integers.

Example 1.

Let it be required to Multiply 27.5126, *by* 16.231.

In this Example there are 4 fractional figures in the Multiplicand, and 3 in the Multiplier, which makes 7, therefore there are 7 figures cut off in the Product, by a Point.

Prove a Sum by the Cross.

```
  27.5126
   16.231
  -------
   275126
  825378
  550252
 1650756
 275126
 -------
446.5570106
```

Example 3.

Let it be required to multiply this mixt number 25.34, *by this Number* 23.

In this Example here is but 2 figures that are fractions in the Multiplicand, and none in the Multiplier, therefore here is but 2 figures cut off in the Product by a point.

```
  25.34
    23.
  -----
  76.02
  5068
  -----
 582.82
```

Example

Example 3.

If a Decimal Fraction be multiplied by a Decimal Fraction, the figures in the Product must always be equal in number to the Multiplicand and Multiplier, added together.

```
 .1763
   .21
 ------
  1763
 3526
 ------
 .037023
```

But if they are not as in this Example, you must set a Cypher before the Product (towards the left hand) to make them equal.

Division of Decimals.

Divide the Sum as in whole Numbers. then cut off so many Figures for the Decimal parts in the quotient, as the Decimal of the Dividend containeth more places than the Decimal of the Divisor.

Example 1.

Let it be required to divide 35.628 by 2.35.

```
 2
 322(1
 06454(2
 1217308(0
 35.628000(15.1608
 2.3333333
  233333
   22222
```

If there be a Remainder upon the Division, you may add 3 or 4 Cyphers to the Dividend, or more, so will your quotient be the more exact, as in this Example I have added 3 Cyphers.

See the 12. Example in Division for proof.

To Divide a whole Number by a whole Number.

II. *Let it be required to know how much in height will make a Rod square of Brick-work, on the Superficies of a Wall, that is 1378 foot in length.*

Divide 272 (the number of feet in a Rod of Brick-work) by 1378, and the quotient will shew what parts of a foot, will make a Rod square.

```
1
12
382
1004
47130
34993
1482848
2720000 ( .1973
1378886
13777
133
1
```

In this Example, the Dividend is less than the Divisor; therefore you must add 4 or 5 Cyphers to it, and then divide it, and the quotient will be 1973 the fraction of a foot.

If you have not a foot divided decimally, you may by the 3d. Example of Reduction of Fractions to Decimals, reduce it into Inches and Quarters, which will be almost 2 $\frac{1}{4}$ Inches; therefore so much in height will make a Rod Square on a Wall, which is 1378 foot long.

To Divide a whole Number by a mixt Number.

III. *Suppose a Board is 1.75 foot wide, and it is required to know how many parts of a foot in length, will make a foot?*

Divide an Unite, or 1, with 4 or more Cyphers added to it, by 1.75, and the quotient will be .57, which is about 6 ¾ Inches, *&c.*

To Divide a whole Number, by a Decimal Fraction.

The Rule.

Add as many Cyphers to the Dividend (or more if need be) as there are places in the Divisor.

IV. *If* 9 d. *buy* 4 ℔. *of Sugar, what will* 6 l. *buy at that rate?*

First, Find the Decimal for 9 *d.* by the 5th. Example in Reduction of Fractions to Decimals, which will be .0375. Then by the Rule of Three say, If .0375 *l.* buy 4 ℔. what will 6 *l.* buy? First multiply 6 by 4, makes 24, then add 4 Cyphers to 24, and divide it by .0375, and the quotient will be 640 ℔. of Sugar, the Answer.

To

To Divide a Decimal Fraction by a whole Number.

V. *Let it be required to divide* 1 s. 9 d. *among* 28 *Men.*

First, By the 5th. Example of Reduction of Fractions to Decimals, Reduce 1 *s.* 9 *d.* or 21 *d.* into the Fraction of a Pound, which will be .0875, which divide by 28, thus.

```
  1
 130
 2374
.089800 ( 3125
 28888
  222
```

Because the Dividend consists of 6 places, and the Divisor of none, there should be 6 places of parts in the quotient, but there are but 4 figures there; therefore prefix two Cyphers before them, and the quotient will be .003125, which Reduce into its known parts by the 1st. Example of Reduction of Fractions into their known parts, and it will be 3 Farthings for each Man.

How to Number upon Gunter's *Line.*

The Figures 1, 2, 3, *&c.* to 10, sometimes signifie themselves, sometimes 10, 20, 30, *&c.* to 100, sometimes they signifie 100, 200, 300, to 1000, at the end of the Line.

Example I. *How to find 25 on the Line?*

For the figure 2, take 2 on the Line (which ſtands for 20 now) and for 5, take 5 of the great Diviſions on the Line, (which is the middle between figures 2 and 3, or between 20 and 30, and that's the point which ſtands for 25, and ſometimes 250.

II. *To find* 144 *on the Line.*

For 1, take the figure 1 at the beginning of the Line, and for 4, take 4 of the grand or great Diviſions, and for the other 4, take 4 of the ſmalleſt Diviſions (which is almoſt half another of the great Diviſions, and that's the point for 144.

III. *To find* 372 *on the Line.*

For 3 take the figure 3, and for 7 take 7 of the great Diviſions further, and for the figure 2, take 2 of the ſmalleſt Diviſions, and that's the point for 372: It may alſo ſtand for 2.72 feet, that is, 2 foot, and .72 parts of a foot, the foot meaſure being divided into 100 parts.

IV. *To find* 8 *foot* .75 *parts, that is,* $8\frac{3}{4}$ *foot.*

For 8 take the figure 8, for 7 take 7 of the great Diviſions, and for 5 take 5 of the ſmalleſt Diviſions, or if there are no ſmaller Diviſion on your Line, take half another Diviſion, and that's the point which repreſents 8.75 foot.

To

To extend the Compasses upon the Line upwards, is from 1 or 2, &c. towards 10, and downwards the contrary.

☞ Let your measure, that you take the Dimensions with, whither it be Foot, Yard, Ell, Rod, Pole, or Pearch be divided, or supposed to be divided into 100 parts.

Multiplication upon the Line applied to practise, in measuring of Board and Glass.

The RULE.

The extent of the Compasses from 1 to the Multiplicand shall reach the same way, from the Multiplier to the Product.

Or the extent from 1 to the Multiplier, shall reach the same way from the Multiplicand to the Product.

Ex. I. *Suppose a boarded Floor is 7 foot wide, and 9 foot long, and the content in feet is required.*

Extend from 1 in the middle of the Line to 9, the Multiplicand downwards, the same extent will reach from 7 the Multiplier, to 63 the Product, or content in feet of the Boarded Floor.

Or the extent between 1 and 7, will reach from 9 to 63 foot as before.

II. *Let it be required to know how many feet is in a Board that is 3 foot wide, and 17 foot long?*

Extend from 1 to 3 upwards, the same extent will reach from 17 to 51 the content in feet.

Or extend from 1 to 17, the same extent will reach from 3 to 51 foot, the content of the Board required.

III. *If a Board is* 1.25 *foot wide, (that is,* 1 *foot and a quarter, because* 25 *is a* $\frac{1}{4}$ *of* 100) *and* 16.5 *foot long (that is,* 16 *foot and a half, because* 5 *is the half of* 10) *How many square feet is therein?*

Extend from 1 to 25, that extent will reach the same way from 16.5 to 20 foot, and about 62 parts Answer.

Or the extent from 1 to 16.5 will reach from 1.25 to 20.62 feet.

By Arithmetick

Length	16.5
Breadth	1.25
	825
	330
	165
	20.625

IV. *How many Square of Tyling is there in a Roof which is* 36. *foot wide, and* 23.5 *foot long.*

Extend from 1 to 36.3, the same extent will reach from 23.5 to about 8.53 foot, from which cut off the odd 53 foot, and it will be 8 Squares, 53 foot the Answer.

By

	36.3
	23.5
By Arithmetick	1815
	1089
	726
Square	8153.05

☞ Note, That Tyling, and Carpenters Work, as Flooring, Partitioning, and Roofing are all measured by the Square of 10 foot, containing 100 Square feet.

V. *If a Ceiling be 5.25 Yards in length, and 4.75 in breadth, How many square Yards are therein?*

Extend from 1. to 4.75, the same extent will reach the same way from 5.25, to 24.93 Yards the Product, and content

Length	5.25
Breadth	4.75
By Arithmetick	2625
	3675
	2100
	24.9375

☞ Note, That after the same manner, Joyners and Painters Work are measured (that is) by the Yard Square. Here I will end Multiplication of Measures divided Decimally, and proceed to teach.

How

How to Multiply Feet by Inches.

The RULE.

Extend always from 12 to the breadth, that extent will reach the same way, from the length to the content in feet.

Ex. I. *If a Board is 9 Inches broad, and 15 Foot long? How many Foot is therein?*

Extend from 12 to 9 downwards, that extent will reach the same way, from 15, to 11 foot and a quarter.

Or the Extent from 12 to 15 upwards will reach the same way from 9 to $11\frac{1}{4}$ as before.

By Arithmetick, Multiply 15 by 9, and divide the Product by 12, and the Quotient gives $11\frac{1}{4}$ feet.

☞ If one end of the Board be wider than the other, add the Inches of the breadth at each end together, and take half that number for the mean breadth, or sometimes the breadth is taken at the middle of the Board. See the foregoing Table of Board measure.

II. *If a Board be 21 Inches in breadth, and 15.5 foot in length (that is) $5\frac{1}{2}$, How many Foot is therein?*

Extend from 12 to 21 upwards, that extent will reach the same way. from 15.5 to $27\frac{1}{8}$ foot.

To

To Multiply Feet and Inches, by Feet and Inches Arithmetically.

Example, *Suppose a Wall, or other long Square be 21 Foot 6 Inches in Length, and 15 Foot 3 Inches in breadth, How many foot are therein?*

First, The Feet multiplied by themselves, make 315 foot.

Fe.		In.
21	X	6
15	X	3

Secondly, Multiply 3 by 21 cross ways makes 63, which divided by 12 the Quotient and Remainder make 5 Foot 3 Inches to be added to the 315 foot.

Fe. 315		In.
5	—	3
7	—	6
0	—	$1\frac{1}{2}$
Fe. 327	—	$10\frac{1}{2}$

Thirdly, Multiply 6 by 15 cross ways also, and it gives 90, which divide by 12 (as before) gives 7 foot, 6 Inches to be added also, as in the Margin.

Lastly, Multiply the Inches by themselves, as 3 times 6 is 18, which 18 is but one Inch and half (for what we call an Inch here, is 12 Inches long, and one Inch in breadth.) Add all these Products together (as may be seen in the Margin) and the Sum is 327 Foot, 10 Inches and half, the Answer.

Note, That if you multiply 21 foot, by 15 foot 3 Inches, the Product will be 320 foot 3 inches the Answer.

Example

Example, *Suppose a Pane of Glass is in breadth* $46\frac{1}{2}$ *Inches, and in length* 65 *Inches, How many foot is therein?*

Extend from 144 (the number of Square Inches in a Foot) upwards to 46.5, the same extent will reach from 65 to almost 21 foot the Content.

☞ Note, If the point of the Compasses fall off the Line (in your work) remove it to the same place on the other Line.

By Arithmetick

			Breadth 46.5
			Length 65
14			2325
3022	142.5		2750
1444	20	foot Answer.	
14	144		3022.5

The Answer is 20 foot, and 142 Inches and half, which wants about an Inch and half of 21 foot. See 3d. Ezample in Vulgar Fractions.

Note, That if you have several Panes of Glass standing together all of one height, lay a string along the Window, and take all the breadth together in one Sum, which Sum take for the length, and the heighth of the Window for the breadth, and work as before. Note, Deducting for Ovals, or half Rounds (if any) but measure them as if they were square: A Quarry of the ordinary Glass are 6 Inches from corner to corner one way, and 4 Inches the other, each 12 flat Inches, and therefore 12 makes a foot. See the Figure thereof marked W, in the Circle, in measuring of Land, &c.

To

To Multiply Feet into Yards.

Example. *Suppose a House that is Plaistered round, is 32 foot about, and 11 foot 6 Inches in height, How many square Yards of Plaistering is on the VVall?*

Extend from 9 upwards to 11.5, the same extent will reach from 32, to almost 41 Yards the Content.

By Arithmetick

```
   11.5
   32
  ----
  230
  345
  ----
 368.0
```

```
 0        8
 36(8(   40—
 98        9
```

In this Example the Product 368 are Feet, therefore to reduce them into Yards, divide them by 9, (the feet in a square yard) and the Quotient gives 40 Yards and 8 foot, Answer.

To measure Brick-work.

Brick Walls are measured by the Rod or Perch of 16 $\frac{1}{2}$ feet in length (as also Land) which contains 272 $\frac{1}{4}$ square feet, one quarter thereof is 68 $\frac{11}{16}$ square feet.

I. *If a VVall be 13 foot 3 inches high, and 120 foot long, how many square Rods is in there on the face of the wall?*

Extend

Extend from 272 to 13.25 downwards, that extent will reach the same way from 120 to 5 Rod, and about 84 parts, which parts make $\frac{3}{4}$ of a Rod and 26 foot.

By Arithmetick

```
 13.25
   120
 ------          (23                          (2
                  8
 26500          159(0 ( 5 Rod.          23(6 ( 3Quart.
 1325             272                     68
 ------
 1590.00                    R.     Qrs.     Fe.
 ------          Answer     5 ------ 3 ------ 26
```

See the Table of Wall Measure.

☞ Note, That if you take the Dimensions of the sides of the House on the inside, you must take the Dimensions of the ends of the House on the outside, deducting for Doors, Windows, &c.

There is one thing more to be considered in the measuring of Brickwork, namely the thickness of the Wall.

For if it be thicker than one Brick and half, there will be more Rods than you measured on the surface of the Wall.

Or if it be less than one Brick and half, it will contain fewer Rods than you measured when Reduced into Standard measure of one Brick and half thick for the Reducing thereof, take this

General RULE.

Multiply the number of feet on the face or side of the wall, by the number of half brick the Wall is in thickness, one third part of the Product gives the number of feet contained in the Wall, which reduce into Rods, as is already taught,

II.

II *If a VVall be 9 Rod on the outside, and 5 half bricks thick, how many Rod of one brick and half is there in the Wall.*

Extend 3 downwards to 5, that extent will reach the same way from 9 to 15 Rod the Answer.

Or, as 3 to 5, so 9 to 15 Answer.

5

45

45 (15 Answer.

Division by the Line.

In Division, as in Multiplication, there are three terms, *viz.* The Dividend, the Divisor, and the Quotient, and to work Division on the Line.

This is the RULE.

The extent of the Compasses from the Divisor to 1, shall reach from the Dividend (the same way) to the Quotient; or the extent from the Divisor to the Dividend, shall reach the same way from 1 to the Quotient.

I. *Let it be required to know how many Yards are there in 63 foot of VVainscot.*

Divide 63 by 9, the Quotient gives the Content in Yards, extend from 9 the Divisor downwards, to 1. the same extent will reach from 63 the Dividend, the same way to 7 the Quotient.

 Or

Or the extend from .9 to 63 upwards, will reach the same way from .1 to 7, &c.

II. *Let it be required to divide* 34.4 *by* 4.3.

Extend from 4.3 the Divisor, to 344 upward, the same extent will reach from 1. at the beginning of the Line, to 8 the Quotient.

These Examples may be done several other ways, which I will leave to the Learners Ingenuity to find out.

III. *How many Rods of brick-work, is there in* 4085 *Foot?*

Extend from 272, to 1. downwards, the same extent will reach the same way, from 4085, to about 15. Rod, Ans.

IV. *How many feet are there in* 3168 *inches flat measure?*

Extend from 144, to .1 downward, that extent will reach from 3168 inches, to 22 foot the Answer.

V. *If a* Board *be* .72 *parts of a foot broad, how much thereof in length will make a foot.*

Extend from .72 the Divisor, upwards to .1 that extent will reach from .1, (which is now the Dividend) the same way, to .1 foot, 39 parts the Answer.

a foot. A Board one inch thick, and 147 inches and a little above a quarter round, as a Circle is a solid foot. A Vessel of a Foot square may hold about 3 half pecks, and 7 quarts; a Yard square, that is 27 solid feet, may hold about 22 or 23 Bushels of Wheat; 10 foot is an Hogshead, 20 a But, or Pipe, 40 foot a Tun, 50 foot a Load.

If a piece of Timber be 15 Inches broad, and 9 Inches thick, What is the square?

The Rule to find the true Square.

The middle between the length and breadth of any long square, being measured with Compasses, upon *Gunter*'s Line, is the side of a square equal to that long square, *&c.*

Extend from 9 to 15, the mid-way of that extent is 11 inches and 3 quarters, the true square.

II. *A piece of Timber of 11.75 inches square, and 12 foot long, How many solid foot is therein?*

Extend from 11.75 the square to 12 (always) that extent twice upwards from 12 foot, the length will reach to 11.25, that is, 11 foot and a quarter.

By Arithmetick

Breadth	15	
Depth	9	
Inches at the end	135	(43
Length	144	114
		226(2
		19440 (11 $\frac{432}{1728}$ Answ.
	540	17288
	540	172
	135	
Inches	19440	

III. *Suppose a Stick be 9 inches square, how much in the length thereof will make a solid foot.*

Multiply 9 by 9, gives 81; then divide 1728 by 81, the Quotient is 21 $\frac{27}{81}$ inches in the length to make a foot.

Lastly, Multiply the Numerator 27 by 10 (the parts of an inch) and that product divide by 81 also, gives in the Quotient 3 tenths of an inch, therefore at 9 inches square, 21 inches and 3 tenths in length, make a foot, Answer.

To measure Timber, having 3, 5, 6, or 8 equal sides.

1. To measure a piece of Timber of 3 equal sides, whose Base, or end thereof, is like the triangle E.R C, of the Circle N, measuring of Land, &c. and how to measure it see the 12th. Example there. Having found the Superficial inches at the end, multi-

The Rule of Three *by the Line.*

The extent from the first number to the second, will reach the same way from the third to the fourth, or the extent from the first number to the third, will reach from the second to the fourth.

If 3 *Yards cost* 10 s. 6 d. *what will* 17 *Yards cost?*

Extend from 3 to 10.5 *s.* upwards, that extent will reach from 17 to 59.5 *s.* that is, 2 *l.* 19 *s.* 6 *d.*

Or the extent from 3 to 17. downwards will reach from 10.5 *s.* to 59.5 as before.

See another Example of this in the measuring of an Oval.

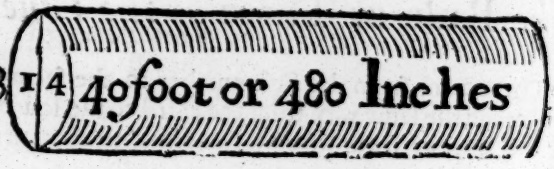
To Measure Round Timber.

Multiply the number of Inches of the girt in its self, and that product always by 7, and the last product divide always by 88, the Quotient gives the Area, or Superficial Inches at the end of the Timber.

Lastly, Multiply the said Superficial Inches at the end by the length in Inches, and the Product gives the solid Inches, which divide by 1728, the Quotient gives the solid feet. See 5th. Example in Land Measure.

Or thus,

II. *If a Stick, or round Stone be* 62 *inches in compass, what the Square?*



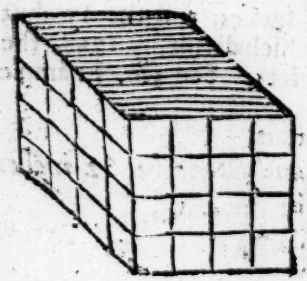
Extend always from .10 downwards, to 62 the Girt, the same extent from 28, always will reach to 17 ½ Inches the Square.

II. *Let a Stick be 17 ½ Inches square, and 13 foot long, How many solid foot is therein?*

Extend from 17 ½ Inches the square to .12 always that extent twice upwards from .13 the length will reach to 28 foot almost Answer. See the Table for round Timber.

III. *If the girt be 4 foot 92 parts, and the length 15 foot.*

Extend from .1 to 4.91, the same extent will reach from 15 foot the length, to .73 foot, 65 parts Answer.



☞ Note, That in a solid foot of Timber is 1728 Cube Inches; 864 Inches is half a foot, 432 inches is a quarter of a foot; in a solid foot is 8 Squares, each 6 inches square, and in a solid foot is 64 square quarters of a

end, and the difference will be 5; then by the Rule of Three, say, If 5 give 18, the length of the side of the Segment A B D E F, what will 10 the square root of the little end give? The Answer will be 36 the length of the top part, which cut off.

Then according to the former Rule, measure the top part BCD, which is 1200 Cubical Inches, then Subtract this Number from 4050 the Area, or Content of the whole Piramid, and the remainder will be 2850, the true content of the frustrum A,B,D,E,F, in Cubical Inches.

The frustrum of a Cone may be measured after the same manner, subtracting the Diameter of the little end, out of the Diameter of the great end, &c.

☞ **Note, That the square Root of any number is found by extending the Compasses from one upon the Line, to that number, the midway of that extent is the Root, or Number desired, for 12 is the Root of 144, because 12 times 12, is 144; and 12 is also the Cubick Root of 1728: Therefore to find the Cube Root of 1728.** *Of the Square and Cubick Root.*

Extend from 1728, to 1, two third parts of that extent will reach from 1728 downwards, to 12 the Cubick Root. Again,

If 12 be the Cubick Root, What is the Number?

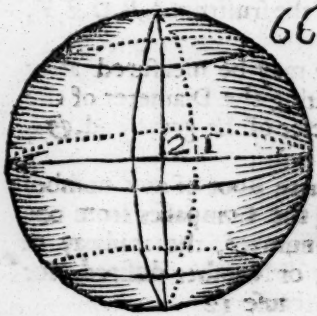
Extend from 1 to 12 upwards, that extent thrice the same way from 12, will reach to 1728 the Cube Number.

I have writren several Questions of the use of the Square and Cubick Roots, in the measuring of plain Triangles, &c. but the Book will not conveniently admit it, and several other things, because I would not have it exceed a Pocket-Book, therefore excuse my shortness, and brevity of the Rules in this Book.

To

To measure a Sphere, Globe, or Bullet.

I. *How many Square Inches is on the outside of a Globe, or Ball?*



Multiply the thickness, or Diameter 21, by the Circumference 66 Inches, the Product is 1386 Inches the Answer.

Extend from 1 to 21 upwards, the same extent the same way will reach from 66, to 1386.

II. *How many solid Inches is in any Globe, or Bullet?*

Suppose the thickness, or Diameter (as above) be 21; multiply 21 by 21; and that product by 21, the which multiply by 11, and the Product will be 101871, which divide by 21 gives 4851, the solid Inches in the Globe.

Extend from 10 to 21 the Diametet upwards the same extent thrice repeated the same way from 52360 (the Solid Content of a Globe, whose Diameter is 10) will reach to 4851, the Solid Content.

III. *If an Iron Bullet, whose Diameter is 4 Inches, weigheth 9 ℔. What is the weight of another Iron Bullet, whose Diameter is 8 Inches?*

Ex-

multiply them into the inches of the length of the piece, and the Product is the solid inches in the piece, which divide by 1728 as before.

To measure Timber of any number of equal sides.

Suppose the end of a piece of Timber have 6 equal sides, as the figure marked X, in the Circle in Land measure, to find the Superficial Inches thereof. See the 5th. Example there.

Having found the Superficial Inches at the end, multiply them into the inches of the length, and the Product gives the solid inches as before.

☞ To measure taper Timber exactly, see the following, of measuring a Piramid, or Cone.

To measure a Cone, and Pyramid.

To measure a CONE.

First find the Superficial Inches of the Base, or bottom, by the 5th. Example in Land measure; which multiply into one third part of the length, gives the Content in solid Inches, which divide by 1728, &c.

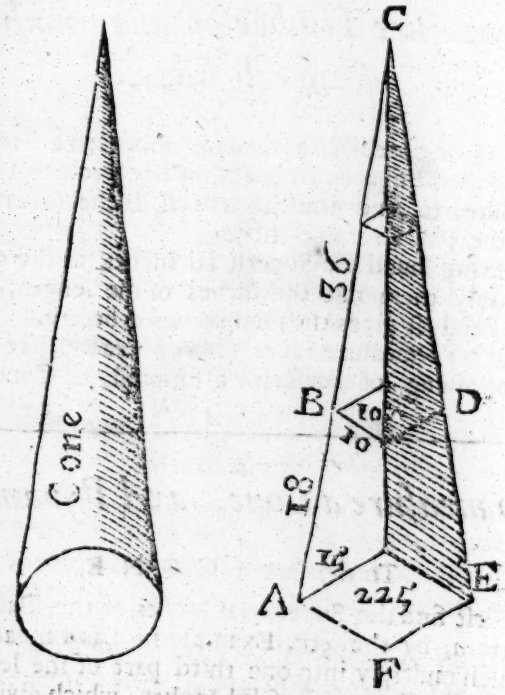
To measure the PIRAMID.

Suppose this Piramid A, C, E, is 15 inches square at the base, or bottom, which multiplied in its self, makes 225 the Superficial Content of the base inches. Then multiply 225 by 18, the third part of the length gives 4050 the Area, or Content in Cubical inches.

By

By the Line.

Extend from 1, to 225, the flat inches at the Base upwards, that extent the same way will reach from 18 (1 third part of the length) to 4050 the Content in Cubical Inches.



How to measure the Segment, or Frustrum ABEF, *the other end* (viz.) BCD *being cut off.*

First, Find the length of the part which is cut off, thus, from 15, the square root of the great end or base, subtract 10 the square root of the little end,

Extend from 4 to 8 downwards, that extent the same way thrice repreated from 9, will reach to 72 ℔. Answer.

PROOF.

Extend from 9 to 72 downwards, that extent thrice the same way from 8, will reach to 4 Inches the Diameter- Having the Circumference to find the Diameter, see 1. Examp. in measuring of Land.

The Measuring of Land, &c.

In Reduction I have mentioned the original of Measures in length, to which I refer you, to be well acquainted therewith before you proceed. But first, I shall give you a few

Geometrical Definitions.

1. The Circle A B C K in the Margent, is a round Line, called, Circumference, and sometimes it is called Perimeter, Terimeter, and Perphery.

2. The Line A C, which cutteth the whole Circle In 2 equal parts, is called Diameter, in the middle thereof at E, is the Center, or middle point of the Circle.

3. A Chordline, is the Line G H, and is shorter than the Diameter.

4. The Line A E, or E K is half a Diameter, called a Semidiameter, or Radius.

5. The Line G B, or G B H, is part of an Arch of a Circle.

6. The Square G Z R E, is a long Square, called, a Parallelogram, and the Angle thereof at R, is a square corner, called a right Angle, so also are the other 3 Angles GZE, waving the dotted Lines therein

7. The Triangle EKC is an Equilateral Triangle, that is, the sides are equal to each other, it is also called an Equiangular Triangle, the Angles being all equal.

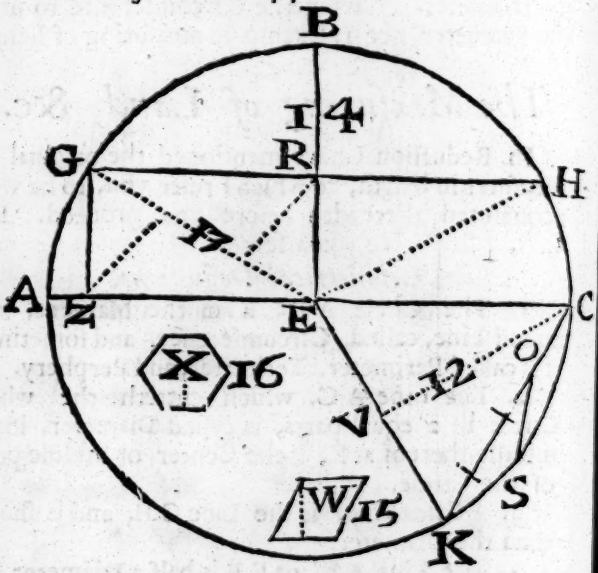
8. All Angles which are less than a right Angle, are called Acute, or Sharp Angles, as the Angles E K C are.

9. That

9. That part of a Circle which is contained under two Semidiameters, and part of the Circumference, is a Sector of a Circle, as the figures AEK and ECK.

Note, In the Sector AEK, the Angle or Corner at E, is an Obtuse, or Blunt Angle.

How much is the Diameter of a Circle whose Circumference is 44 ?



Extend from 22 to 7 downwards, that extent will reach the same way from 44 to 14 the Diameter.

By Arithmetick.

If a Globe or Circle of $31\frac{3}{7}$ *Inch. Circumference, what Diameter ?*

$$\begin{array}{r} 31\frac{3}{7} \\ \hline 220 \end{array}$$

Reduce the $31\frac{3}{7}$ by Example the 2d. in Multiplication of Fractions.

222
222 (10 Inc. Diameter.
2

III. *How*

3. *How much is the Circumference of a Circle, whose Diameter is* 14 ?

Extend from 7 to 14, that extent from 22 the same way, will reach to 44 Circumference

By Arithmetick.

4. *If a Circle hath* 10 *Inches Diameter, what Circumference ?*

22	1(3	
10	220	$31\frac{3}{7}$ Inches Circumference.
220	77	

5. *How many Superficial Inches is in any Circle ?*

Multiply half the Circumference by half the Diameter A C, the Product is the Area, or Content.

Or multiply the Diameter in it self, and that Product by 11, and the last Product divide by 14, the Quotient gives the Area.

Or multiply the Sum of the Inches of the Circumference in it self, and that Product by 7, and the last Product divide by 88, the Quotient gives the Area.

Note, That in what kind of measure you measure with, of the same kind will the Content found be, as if the Dimensions be taken in Inches and Parts, the Area will be Inches ; if in Feet, the Area will be Feet ; if in Perches, *&c.*

6. *How many Superficial Inches is in any Semicircle?*

Let A B H C E be the half Circle given.

Multiply half the Diameter A E in itself, and that Product multiply by 22, this last Product divide by 14, the Quotient gives the Area.

7. *To Measure the Quadrant, or quarter of the Circle A G B E.*

Multiply the Semidiameter B E or A E in itself, and that Product by 11, and divide the last Product by 14, the Quotient gives the Area.

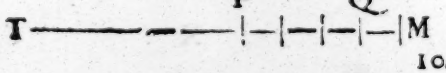
8. *How to Measure any Part or Portion of a Circle, being bigger or lesser than half a Circle.*

The Rule.

Multiply half the Arch-line thereof by the Semidiameter, the Product gives the Area.

9 *How to find the length of the Arch-line G B H, and to lay it upon a straight line.*

First, Draw a right line upon Paper, as the line T M below; then with the Compasses, set off the Chord-line therein, which will reach from T to P; then take the distance between G B or H B and set it twice from T in the same line, and it will reach to Q. Lastly, Take one third of the distance between P Q and set it off from Q to M; then the distance between T to M shall be the length of the Arch-line G B H required.



10. *How*

10. *How to measure the Sector E K S C in the Circle above.*

First, Draw the right line K C, which divide into four equal parts; then set one of the parts from K to S in the Arch-line, and draw the line S O, which line S O shall be equal to half the Arch-line K S C. Lastly, Multiply the line S O by the Semidiameter E K, the Product gives the Area of the Sector E K S C.

11. *How to measure the Segment C O K S.*

By the last Example is found the whole Content of the Sector E K S C, therefore substract the Triangle E C K therefrom and you have your desire; in order to which I shall shew how to measure a Triangle.

12. *How to measure the Triangle E C K.*

First, The Line E K call the Base, and the dotted line C V call the perpendicular.

Or in the Triangle G E H R, call the line G R H the Base, and R E the perpendicular, (because the perpendicular should fall from an Angle square-wise upon the Base, or longest side, (if one side be longer than another). Therefore

The whole perpendicular multiplied into the whole Base giveth the double Content of the Triangle.

Or half the Base multiplied into the whole Perpendicular will give the Area.

Or the whole Base multiplied into half the Perpendicular gives the Area or Content.

13. *How to measure a Triangle by the Chain and the Line.*

Let G R H E be the Triangle given (in the Circle above.)

Suppose the Perpendicular E R be 7 Chains, 50 Links; and the Base, or longest side C R H, be 45 Chains, 75 Links, to find the Content in Acres.

Extend from 20 to 7, 50 upwards, that extent will reach the same way from 45, 75, to 17, 15, that is 17 Acres $\frac{15}{100}$ parts.

Note, That the dividing of Closes or Fields into Triangles, is the only way to know their Content.

14. *How to measure the Segment G B H R (in the Circle above.)*

By the 9th Example you were taught how to find the length of the Arch-line thereof, as G B H, therefore multiply the half Arch-line by the Semidiameter B E or G E, the Product gives the Content of the Sector G B H E; therefore to find the Content of the Segment G B H R, substract the Content of the Triangle G R H E, and the remainder is the true Content of the Segment G B H R. By the same Rule you may measure any bigger or lesser part of a Circle, which is also of great use to find the Content of a Cask part empty, *&c.*

15. The Figure marked W in the Circle above, in the form of a Quarry of Glass, called a *Rhombus*, multiply the dotted line thereof by one of the sides, it gives the Area.

16. The

16. The Figure marked X in the Circle above, is called a *Polygon*; multiply the Circumference by half the Diameter (taken from the center to the middle of one of the sides) and the Product gives the Area. The same is to be observed, if the Figure have 7, 8, 10, or other number of equal sides, but if the sides are unequal, then they are called Irregular *Polygons*, and must be divided into Triangles.

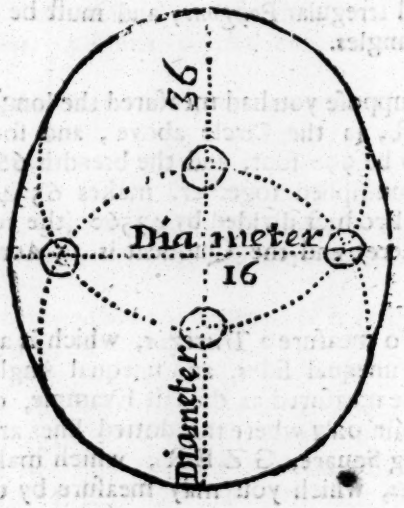
17. Suppose you had measured the long square, G Z E R, in the Circle above, and found the length to be 990 foot, and the breadth 660 foot, which multiplied together, makes 653400 feet, and the Product divided by 43560 (the feet in a square Acre) and the Quotient is 15 Acres, the Answer.

18. To measure a *Trapezia*, which is a Figure of four unequal sides, and unequal Angles, yet may it be measured as the last Example, drawing your Chain only where the dotted lines are in the said long Square, G Z E R, which makes two Triangles, which you may measure by the 12th Example.

Note, That I have in the 5th Example in Multiplication, and 8th Example in Division in Vulgar Arithmetick, shewed how to Measure a square piece of Land, and also how to Reduce any Product of Poles or Perches into Acres, &c. See *Reduction of Land-measure.*

19. *How to measure an Oval or Elipsis.*

The way of making an Oval, you may see by the Figure thereof following, that it is done only by the Compasses.



The Rule to measure it.

The middle between the shortest and longest Diameters of an Oval, is the Diameter of a Circle, equal to the Oval, or Elipsis: Therefore

Extend the Compasses from 16 the shortest, to 36 the longest Diameter, the mid-way of that extent upon the line is 24, the mean Diameter.

The Diameter being found to be 24, you may find the superficial Inches by the 5th Example before.

Or

Or thus by the Line.

First, Square the Diameter, that is, multiply 24 by 24, (as is already taught in Multiplication upon the Line) and the Product will be 576; then say by the Rule of three, As 14 is to 576, so is 11 to the Content of the Oval.

Extend from 14 to 576 upwards, the same extent will reach from 11 to $452\frac{8}{14}$ the Area of the Oval.

Note, That in a square Mile, is Acres 640; Chains, 6400; Perches, 102400; Paces, 1115136; square Yards, 3097600; square Feet, 27878400; square Links, 64000000; and square Inches, 4014489600.

A TABLE *shewing how to lay out an Acre of Ground.*

Poles breadth.	Length of the Acre. Poles.	Feet.	Poles breadth.	Length of the Acre. Poles.	Feet
1	160	0	25	6	6
2	80	0	26	6	2½
3	53	5½	27	5	15¼
4	40	0	28	5	11½
5	32	0	29	5	8½
6	26	11	30	5	5½
7	22	14	31	5	3½
8	20	0	32	5	0
9	17	13	33	4	14
10	16	0	34	4	11½
11	14	9	35	4	9½
12	13	5½	36	4	7¼
13	12	5	37	4	5¼
14	11	7	38	4	3½
15	10	11	39	4	2
16	10	0	40	4	0
17	9	7	41	3	15
18	8	14½	42	3	13¼
19	8	7	43	3	11¾
20	8	0	44	3	10½
21	7	10	45	3	9
22	7	4½	46	3	8
23	6	15½	47	3	7
24	6	11½	48	3	6

Poles breadth.	Length of the Acre.		Poles breadth	Length of the Acre.	
	Poles.	Feet.		Poles.	Feet.
49	3	4	65	2	8
50	3	3	66	2	7
51	3	2	67	2	$6\frac{1}{2}$
52	3	1	68	2	6
53	3	$1\frac{1}{2}$	69	2	$5\frac{1}{2}$
54	2	16	70	2	5
55	2	15	71	2	$4\frac{1}{4}$
56	2	4	72	2	4
57	2	13	73	2	$3\frac{1}{2}$
58	2	14	74	2	3
59	2	12	75	2	$2\frac{1}{2}$
60	2	11	76	2	2
61	2	10	77	2	$1\frac{1}{2}$
62	2	$9\frac{1}{2}$	78	2	1
63	2	9	79	2	$0\frac{1}{4}$
64	2	$8\frac{1}{4}$	80	2	0

The Use of this Table.

Suppose the length or side of a Close or Furlong be 43 Poles, How much in breadth will make an Acre?

Look 43 in the first Column, and right against it is three Pole, eleven Feet, and about ten Inches, in breadth to make an Acre; twice that is two Acres, *&c.*

Note, That if the Table should be mis-printed, I will give you one Example whereby you may prove all, or any part of this Table.

The

The side being 43 Poles, (according to the Example above) I divide 160 (the Poles in one Acre) by 43, and the Quotient gives 3 Poles, 31 parts.

```
(3
3(1
160
43
```
3 Pole.

Secondly, I multiply the 31 parts by $16\frac{1}{2}$, (the Feet in 1 Pole in length) adding to the Product, half 31, that is $15\frac{1}{2}$, makes $511\frac{1}{2}$.

```
31
16½
---
186
31
15½
---
511½ Product.
```

Thirdly, I divide the $511\frac{1}{2}$ by 43 also, and the Quotient gives 11 Feet, and $38\frac{1}{2}$ remainder.

```
(3
4
18(8
511
433
4
```
½ 11 feet

Fourthly, I multiply the remainder $38\frac{1}{2}$ by 12, (the Inches in a Foot in length) adding to the Product the half of 12 the multiplier, and the Product is 462 Inches.

```
38½
12
---
76
386
---
462 Inches.
```

Lastly,

Lastly, I divide the 462 by 43 also, and the Quotient gives 10 Inches, and 32 remaining being gathered into one Sum, the breadth to make an Acre is 3 — 11 — 10 $\frac{32}{43}$.

(3
46(2(10
43 3
4

P. F. In.

To measure Land with Gunter's *Chain, which is divided into* 100 *Links, at every* 10*th Link is a Brass Ring, the whole Chain is* 4 *Poles in length.*

Suppose, that the length of a piece of Land be 9 Chains, 50 Links, the breadth 6 Chains, 25 Links, How many Acres is contained in the piece of Land?

First, Multiply the Chains and Links together as whole Numbers, and from the Product cut off five Figures (always) next the right hand, and those to the left hand are Acres.

Secondly, The remaining Figures cut off from the 5 Acres, I multiply by 4 (the Roods in 1 Acre) from which I also cut off five Figures, and the remaining 3 is Roods.

Lastly, I multiply the 5 Figures, so cut off from the Roods by 40 (the Poles in a Rood) and those cut off are Poles.

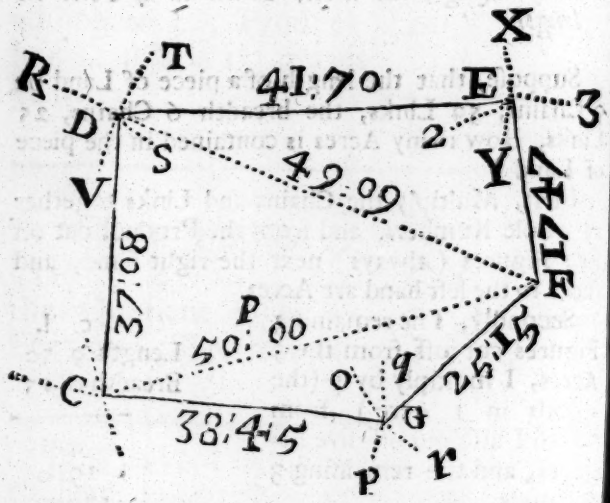
The Content is 5^{a}--3^{r}--30^{p}, as appeareth in the Margin.

	c.	l.
Length	9	50
Breadth	6	25
	4750	
	1900	
	5700	
Acres	5|93750	
	4	
Roods	3|75000	
	40	
Poles	30|00000	

Note,

Note, That if in your length or breadth, the Links are under 10, add a Cypher to the left hand. And if they had been Figures, as now they are Cyphers cut off from the Poles, they had been but the part of the 100000 parts of a Pole.

Example 22. *To take the Plot of a Close or Field on Paper by the Chain or Perch, (but the Perch must first be divided into 100 parts, as I mentioned before.)*



Let the Figure C D E F G represent a Close or Field to be plotted on Paper.

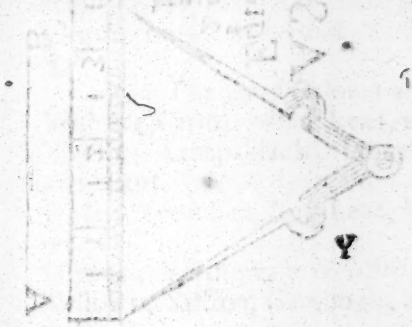
First, I measure with the Chain, (or Pole, divided into 100 parts) from F to C, (the dotted Line within the Close) which contains 50 Poles.

Then I measure the side C G, 38 Pole, 45 parts, and the side F G, 25 Pole, 15 parts, which done,

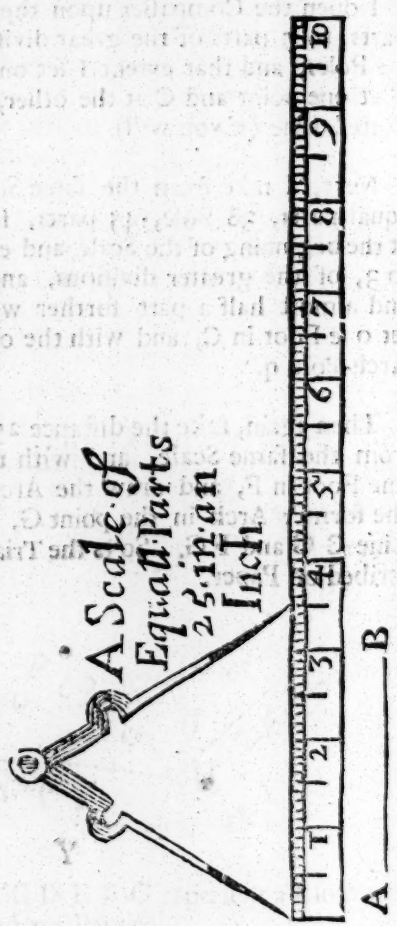
I open the Compasses upon the Scale of equal parts, to 5 parts of the great divisions, to signifie 50 Poles, and that extent I set on Paper, placing F at one point and C at the other, and draw the dotted Line (if you will).

Next, I take from the same Scale, or Line of equal parts, 38 Pole, 45 parts, setting one Foot at the beginning of the Scale, and extend the other to 3, of the greater divisions, and 8 small parts, and almost half a part further with that extent, set one Foot in C, and with the other I draw the Arch-Pole q.

Then again, take the distance 25 Pole, 15 parts, from the same Scale, and with that distance set one Foot in F, and draw the Arch O R, cutting the former Arch in the point G, then draw the Line C G and F G. So is the Triangle C F G described on Paper.



By this Rule you may finish your Plot, observing, that it must all be divided into Triangles by Example 12th, remembring, that for every Chain, or Pole, you must take off the Scale one of the great Divisions, (as from 4 to 5 is one division) and for every, 10 Links, or one tenth part of your Pole, take one of the small divisions. Or with the Compasses you may make a line of equal parts, according to the bigness you desire your Plot; or having drawn a Plot, may by this Rule make it bigger or lesser.



Example

Example 23. *To reduce a Plot already drawn upon Paper bigger or lesser, is shewed above; but if you have disfigured your first Plot, by dividing it into Triangles and the like, you may draw another upon Paper or Parchment thus:*

Lay the Parchment or Paper upon a smooth Table, upon which fix your rough Plot; then, with a needle, prick holes through every Corner or Angle in the Plot, that they may appear on the Paper or Parchment under it; then take them asunder, and draw lines from Angle to Angle, as they are in the other Plot.

Of Colouring of Maps, &c.

IF you desire to beautifie your Plot already drawn, first pounce or rub over the Paper or Parchment-Plot with the fine Powder of Gum Sandrack, burnt Alum and Rosin ty'd in a fine Rag.

The chief Colours are:

Whites; Ceruse, white Lead, and Flake-white.

Blacks; Lamp-black, Ivory burnt, Cherry-stones burnt.

Reds; Vermilion, Red-Lead, Indian-lake, Red-Oker.

Greens; Verdigrease, Verditure, Sap-green.

Yellows; Saffron, Gambogia, or Gamboge, yellow Pink.

Blews; Ultramarine, Smalt, Indico, Blew-bice.

All these should be ground fine with fair Water, severally upon a Marble, or other smooth Stone, except Lamp-black, Sap-green, Saffron, Gambogia, and Smalt.

To make Gum-water. Take the clearest Gum-Arabick you can get, dissolve it in Water, which you should use with all your Colours, except Saffron, Sap-green, and Gambogia.

When you use any of these Colours, mix the Colour in an Oyster-shell, or Mussel-shell, with Gum-water; then with a Hair Pencil colour round about the inside of your Plot with what Colour you please; then, to distinguish one Close or Field from another, colour every particular Close with a different Colour, thus:

First colour round about the edges, then dip the Pencil in fair Water, and drive the Colour towards the middle of your Plot, thinner and thinner, till it lose itself, that is, so that the edge of the Colour next the middle cannot be seen.

Or you may colour the Close or Field with its proper colour, as a light green for Pasture, brown for ploughed Land, and dark green for Hedges, *&c.*

To make a good green. Take Verdigrease, and mix a very small quantity of Sap-green with it. The other Colours are best used by themselves without mixing.

Reader, the foregoing Rules (in my judgment) are sufficient for most ordinary occasions in measuring of Land. But if thou think'st I have been too brief, in this and some other things in this Book, (having not room in this small Tract to write much more, being it's design'd for a Pocket Book) thou may'st have recourse to larger Volumes, which will be far easier to thee, having first learned this, which I write not for Money.

Of

Of Gaging of Vessels.

THE Art of Gaging is little different from the Measuring of Timber, (before directed) as in a Foot of Timber is 1728 Cubical or square Inches, and as often as 1728 Inches are found in a piece of Timber, (be it round or square) so many Foot of Timber is contained in the piece.

So in the Art of Gaging, the Gallon for Ale and Beer is agreed on, to be 282 Cubical Inches, and the Wine Gallon 231, and the Gallon of Dry Measure 272.

Therefore so often as 282 square Inches is contained in any Vessel round or square, so many Gallons of Ale or Beer the said Vessel will hold. The same is to be observed in Wine and Dry Measure, *&c.*

Note, That every Cubical Foot may contain 6 Gallons and almost a Pint of Ale or Beer.

Of Wine, 7 Gallons, 2 Quarts and almost a Pint.

And a Cubical Foot of Dry Measure may contain 6 Gallons and a little above half a Gallon.

For 141 Inches is in 2 Quarts of Ale or Beer $70\frac{1}{2}$ one Quart, $35\frac{1}{4}$ Inches in a Pint.

See Reduction of Liquid Measure.

Though you may gage Vessels by the Rule in Timber-measure, notwithstanding take a few Examples in as easie a manner as I can.

Example 1. *Suppose there is a square Tun to be measured, (somewhat like the Figure of the square Foot of Timber in* Exam. 3.) *in length* 105 *Inches, in breadth* 76, *and depth* 46 *Inches, how many square Inches is therein, as also how many Gallons or Barrels.*

Multiply the Dimensions one into another, as is shewed in the 1st Example in square Timber-measure, and the last Product gives 367080 Inches in the Tun: Which divide by 282, or multiply by this number 35461, as in this Example.

Cube Inches in the Tun	367080
The Given Number	35461
	367080
Prove this Sum,	2202480
and such like by	1468320
the Cross.	1835400
	1101240
G.	1301|7023880

And from the Product cut off 7 Figures, (always) or places, to the right hand, (which are the parts of a Gallon) and those to the left hand are Gallons, as in this Example is 1301 Gallons.

Note, That the parts of a Gallon is not considerable, if there happen to be a Cypher next the Gallons: But in that above is the Figure 7, which is the 7 tenth parts of a Gallon; that is, if a Gallon was divided into 10 parts, this is 7 parts thereof; or if the Figure 5 had been in the place of the 7, it had been half a Gallon, because 5 is the half of 10; or if the 70 next the Gallons had been 75, it

it had been three quarters of a Gallon, because 75 is three quarters of 100, &c.

See the 4th Example in Reduction of Decimals.

Lastly, Divide 1301 Gallons, so cut off by 36 (the Gallons in a Barrel of Beer, or by 32 the Gallons in a Barrel of Ale) and the Quotient gives 36 Barrels of Beer, and 5 Gallons remaining, and near three quarters of a Gallon.

Example 2. *How to Gage a Round Tun, Tub, or Furnace.*

First, If your Tun, or the like, be of one bigness or breadth, both at the top and bottom, find the Cube Inches therein contained, as is shewed in round Timber-measure, and reduce it into Gallons, as before.

But, if it be narrower at the top than at the bottom, or the contrary, take the breadth or diameter of the Tun, a little above the middle of it, that is, next the widest end.

Or find the mean Diameter thus:

The Diameter at the Bung or top of the Tun,	26	The two thirds of the difference is 2 Inches, which added to 23, the lesser Diameter makes 25 the mean Diameter.
The Diameter at the Head or bottom of the Tun,	23	
3 Inches difference,	3	

Therefore suppose the mean Diameter of a Tun, Tub, Furnace, or half a swelling Cask, or the like, to be 81 Inches, and the length 48, how many Gallons is therein? The

The Cube Inches contained therein, you may find by the Rule in round Timber-measure, as thus:

The mean Diameter is 81 } Inches.
Length of the Vessel 48 }

Multiply 81 by 81, and that Product by 11, (always) and the last Product divide by 14, (always) the Quotient gives the Content at one Inch deep of the Liquor (if any). 2dly, Multiply the said Quotient by 48, (the length of the Vessel) and the Product gives the solid Inches in the same, which reduce into Gallons, and the Gallons into Barrels, gives 24 Barrels, and about 13 Gallons.

Example 3. *Suppose the mean Diameter of a Cask is 14 Inches, and the Length 72 Inches, how many Gallons are therein?*

Extend the Compasses on *Gunter's* Line, from 19, 95, to 14 the Diameter, that extent twice downwards, from 72 the length, will reach to somewhat above 39 Gallons of Ale.

But if it was a Wine Vessel, extend from 17, 15, (always) to 14 the Diameter, that extent twice downwards from 72, the length in Inches will reach to 48 Gallons.

A

A Table of Area's of Segments, by W. P.

V.	Area	V.	Area	V.	Area.	V.	Area.
1	0017	26	2066	51	5127	76	8155
2	0048	27	2178	52	5255	77	8263
3	0087	28	2292	53	5382	78	8369
4	0134	29	2407	54	5509	79	8473
5	0187	30	2523	55	5636	80	8576
6	0245	31	2640	56	5762	81	8677
7	0308	32	2759	57	5888	82	8776
8	0375	33	2878	58	6014	83	8873
9	0446	34	2998	59	6140	84	8967
10	0520	35	3119	60	6265	85	9059
11	0598	36	3241	61	6389	86	9149
12	0680	37	3364	62	6513	87	9236
13	0764	38	3487	63	6636	88	9320
14	0851	39	3611	64	6759	89	9402
15	0941	40	3735	65	6881	90	9480
16	1033	41	3860	66	7002	91	9554
17	1127	42	3986	67	7122	92	9625
18	1224	43	4112	68	7241	93	9692
19	1323	44	4238	69	7360	94	9755
20	1424	45	4364	70	7477	95	9813
21	1527	46	4491	71	7593	96	9866
22	1631	47	4618	72	7708	97	9913
23	1737	48	4745	73	7822	98	9952
24	1845	49	4873	74	7934	99	9983
25	1955	50	5000	75	8045	100	

The Use of this Table is as follows:

1. It is requisite, that the Bung and Head-Diameters, the Cask length, the whole Content, and the dry and wet Inches be all known, and then if the

the Question be, What is wanting, or what remaining in the Cask?

Divide accordingly either the dry or wet Inches by the Bung Diameter, and the Quotient seek in the Table under V, or versed Sine; against it stands a Number, which multiply by the whole Content, shewing the vacuity, if your Dividend were dry Inches, or shews the remaining Liquor, if your Dividend were wet Inches.

Suppose the Bung Diameter 28, the Content of the Cask 60 Gallons, and dry Inches 7.

Divide 7 by 28, by adding two Cyphers:

700 (25
280
2

Seek this 25 in the Table, over against it you find 1955, which Number multiply by the whole Content 60, so is the wants, 11.7300; cutting off the last four Figures is 11 Gallons, and almost three quarters of a Gallon.

Now if the Question be, What quantity of Liquor is remaining in the Cask?

Divide the wet Inches by the Bung Diameter, that is 21, the wet Inches by 28, (adding two Cyphers) Quotient 75; now against 75 in the Table you find 8045, which being multiplied by 60, the whole Content of the Cask,

The remaining Liquor is	48. 2700
The wants is ———	11. 7300
The whole Content —	60. 0000

Now

Now if after Division there happen a Remainder or Fraction, and that be above half the Divisor, I take the next bigger Number: Or if it be less than half the Divisor, I take the same Number which is in the Quotient.

Another way to measure a Vessel, such as a Butt, Pipe, Hogshead, Barrel, or the like.

First to find the mean Diameter, *viz.*

Add double the Bung Diameter, to once the Head Diameter, and divide their Sum by 3.

The Quotient take for the mean Diameter, as in this Example:

Bung Diameter 27, Head 24, the Length 30 Inches.

As 27
27
24
78

~~1~~
~~7~~8 26
~~3~~3

RULE.

To the double Square of the Bung Diameter, add the Square of the Head Diameter, and that Sum multiply by the Cask length, the last Product divide by 1077, the Quotient is the Ale Gallons; or by 882, the Quotient is the Wine Gallons contained in that Cask.

Bung

24	Bung Diameter	27
24		27
96		189
48		54
576	Double Square	729
		729
		1458
	Square of Head Diameter	576
		2034
	Length of the Cask —	30
		61020

70
7 7 7 8
8 2 0 2 0
2 0 7 7 7
2 0 7

56 7/10 Ale Gallons.

6
8 1 8 2
8 2 0 2 0
8 8 2 2
8 8

69 Wine Gallons.

This is well enough for common Practice.

Mr.

Example 4. *How many Solid Inches are in an Elipsis, (so called) or a Vessel somewhat like unto an Egg.*

Suppose the breadth or shortest Diameter be 16 Inches, and the Length 36, by the 19th Example in Land-measure, the mean Diameter is found to be 24.

Having the mean Diameter, you may find the solid Inches thereof, as is taught in the measuring of Globes before mentioned.

Note, That if any Tun, Copper, or other Vessel, be uneven at the bottom, put as many Gallons of Water therein as will cover the same, and let the top of the Water be accounted the bottom of the Vessel, and work as before is taught.

But if you are to gage the Wort in any Back, or Cooler, (according to *William Hunt's* directions in his *Gager's Magazine*, p. 242.) divide the Sum of the wet Inches, taken in all the places, which in large Backs ought to be in every 5 or 6 Feet square, by the number of places they were taken at, the Quotient will be the true Dipping-place, (or depth) which you are to make accordingly.

Mr. Oughtred's *way of measuring the Frustum of a Spheroid, or Cask.*

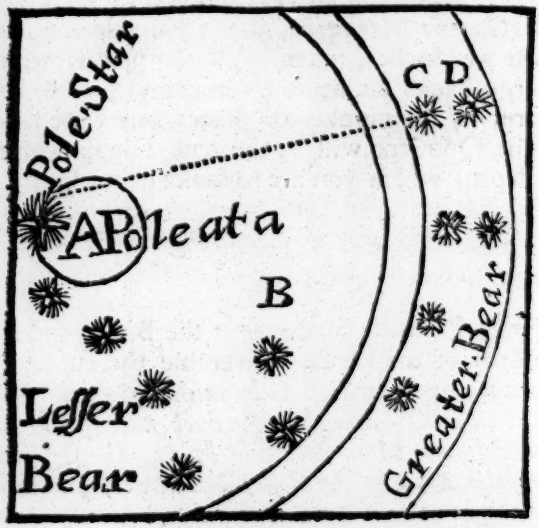
First, Take the Diameter at the Bung, and find the Area of the Circle answerable thereunto, *(as before is taught, which is by multiplying the Diameter in itself, and that Product multiply by* 11, *and the last Product divide by* 14, *the Quotient gives the Area or Superficial Content)* and take two thirds of that Area.

Secondly, Take the Diameter at the Head, and

find the Area of that Circle, and take one third of that Area; add these two Sums together, and multiply the whole by the length of the Vessel, the Product gives the Content of the whole Vessel in Cubique Inches, which reduce into Gallons, as before is taught.

An easie way to make Dials.

IN Dialing you are first to take notice, that the Stile of every Dial already fixed, (that is the Edge or Wire that shades the Hour-lines) points towards the North Pole Star at the upper end, and the lower end towards the South Pole Star: Therefore when you desire to know the Elevation or Heighth of the Pole in your Dwelling, in order to make a Dial by the following Rules,



Observe

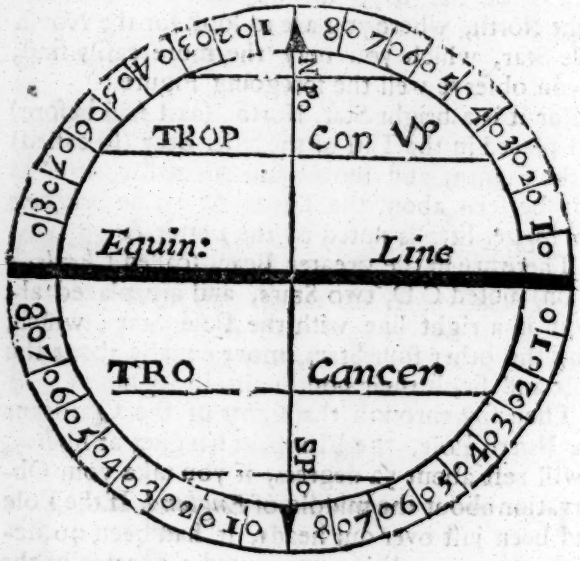
Obſerve, That the Sun riſeth towards the Eaſt, and ſetteth Weſtwards, and is always South juſt at 12 a Clock mid-day, then oppoſite to which laſt is the North, where you are to look for the North Pole Star, which you may the more eaſily find, if you obſerve well the foregoing Figure:

For it is a bright Star, North, (as I ſaid before) and placed in the Tail of the leſſer Bear (ſo called) in the Figure, and moves but a ſmall courſe, as may be ſeen about the Letter A. The brighter and bigger Star is noted by the Letter B.

There are in the greater Bear, (called *Charles's* Wain) noted C D, two Stars, and are placed almoſt in a right line with the Pole Star; which, with the other four Stars, move equally about the Pole and finiſh their courſe alſo in 24 hours.

Then ſpy through the ſights of the Quadrant the North Pole, the Plummet hanging at liberty, it will reſt about 52 degrees, if you take your Obſervation about the middle of *England*. If the Pole had been juſt over our heads, it had been 90 degrees, or parts, being accounted a quarter of the World, from the Horizon or Sun-riſing, to the Zenith or point over our heads, then 4 times 90, make 360 deg. round the World.

Of the Altitude, or Heighth of the Poles.



A Man being upon the Globe of the Earth, (as the Figure sheweth) right under the Equinoctial Line, hath both the Poles, the one in the North, and the other in the South at the Horizon without an elevation, and then he standeth also right upon the middle Line of the Globe of the Earth without any Latitude.

If he remove from the middle Line towards the North or South, the one Pole shall then rise up out of the Horizon, and the other sink under the same.

Goeth he aside from the middle Line of the Earth, 10, 20, or more Degrees in Latitude Northward, the North Pole shall also be elevated 10, 20, or more Degrees, the South Pole to the contrary

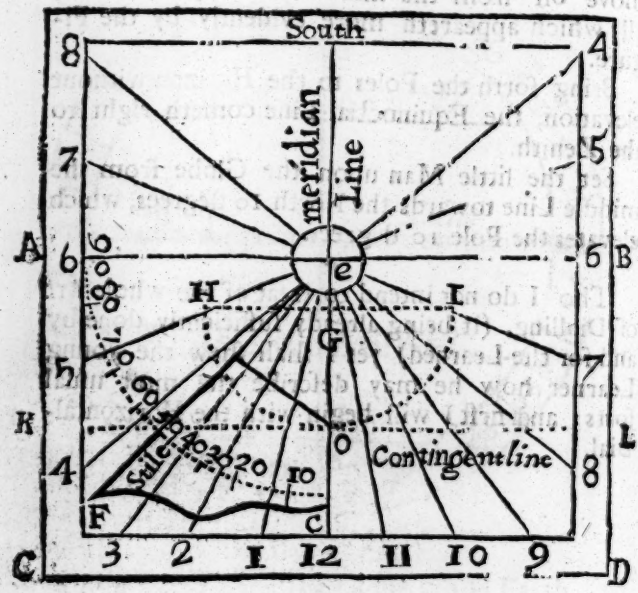
trary ſhall ſink ſo much under the Horizon, and the Equinoctial Line ſhall be altered juſt ſo much Southward from the Zenith (that is juſt over the Head). The contrary happeneth if a Man remove off from the middle Line Southwards; all which appeareth more evidently by the Figure.

Bring forth the Poles to the Horizon without elevation, the Equinoctial Line cometh right to the Zenith.

Set the little Man upon the Globe from the middle Line towards the North 10 degrees, which elevates the Pole 10 degrees.

Tho' I do not intend to treat of the whole Art of Dialling, (it being already ſufficiently done by and for the Learned) yet I ſhall ſhew the young Learner how he may deſcribe the moſt uſual ſorts; and firſt I will begin with the Horizontal-Dial.

Prob. 1. *How to make an Horizontal, or plain Post-Dial.*



North.

It may (for want of better Materials) be made of a ſquare piece of ſheet Lead, and a piece of Tin doubled ſet up for the Stile, that is, the edge that ſhades the Hour-lines.

Draw out the *Dial* on Paper, with the point of the Compaſs (and a Ruler) according to the bigneſs you intend it, and after that (by the ſame pattern) draw it on Lead, Stone, or Board, or what you pleaſe.

Firſt, Draw out the Square of the out-ſide of the *Dial*, (by *Problem* 8.) wherein the Figures for the Hour are to be placed, as the Figure of one above ſheweth. Se-

Secondly, Draw the Meridian, or 12 a Clock Line in the middle of the Square, (as in the Figure) it is the Line which hath 12 at the lower end, and the word South at the other end.

Thirdly, Crofs the faid 12 a Clock line, in the point E (by the Rule in *Prob.* 7.) at right Angles, at each end of the line fet the Figure 6, being for 6 a Clock line.

Next, Open the Compaffes, fetting one foot in the Center E, that is the point where the two firft lines crofs'd each other, and defcribe an Arch of a Circle, from the 12 a Clock line, to the 6 a Clock line, which in this *Dial* is a dotted Arch, and is numbred by 10, 20, to 90 degrees, being a Quadrant or quarter of a Circle.

Next, Divide the faid Quadrant, firft into 3 parts, and each part into 3, will make 9 parts, or 90 parts, called the degrees of a Quadrant, and figure it as in the *Dial* before, (the Heighth, or Elevation of the Pole or North Star, muft be numbred in this Arch-line, according to the Place or Latitude in which you dwell, which in this Example is 52 degrees, which cut off for the heighth of the Style, and is the line F E in this *Dial*.

Next, Draw the dotted line K O L, fquaring the 12 a Clock line at a convenient diftance from the line of 6 a Clock, which line is called the line of Contingence, as may be feen in the *Dial*.

Next, Set one foot of the Compaffes in the point O, that is, where the Contingent line cutteth the 12 a Clock line, and take with the other foot the neareft diftance to the line F E or the line of the Style, with that extent, one foot refting in O, extend the other foot towards E in the 12 a Clock line, defcribe or mark the half Equator or half Circle, marked by the Letters H O I in the *Dial*.

Then divide the half Circle into 12 equal parts, this done,

Lay

Lay a Ruler upon G, the Center, that is, where the Line H I crosseth the 12 a Clock line, and to every of the marks made in the half Circle, and where the Ruler (that is, the edge thereof) shall touch the line of Contingence, there make marks.

Lastly, Lay a Ruler from the Center E, to each mark in the Contingent-line, from whence draw the lines at length, which are the Hour-lines.

Note, For the Hours above the 6 a Clock line, extend the 7 a Clock line through the Center, and it will be for 7 at Night; do so for the other three Hours, as in the *Dial* above you may see is done.

Likewise, The lines E F C do represent the true pattern of the Cock or Gnomon of the *Dial*, which erect at right Angles, over the 12 a Clock line; so is the *Dial* finished.

Prob. 2. *How to fix any Dial exactly South or North without an Instrument.*

Fix a Board, or Trencher, level with the Horizon, (which you may do with the Quadrant following) and with the Compasses draw 3 or 4 Circles one within another about half an Inch distance.

Then set up a Pin in the Center, and in the Forenoon mark upon one of the Circles that the Pin's-head shades in the sun-shine, and in the Afternoon, when the shade of the Pin's-head comes, upon the same Circle make a mark also.

Then divide the distance between these two marks, equally upon the same Circle, and make a point.

Lastly, From this point draw a line through the Center or place where the Pin was set:

Which

Which line is the Meridian line, or 12 a Clock line, for all the Year, upon which line you may place the 12 a Clock line of your *Post-Dial.*

Prob. 3. *Some of the Uses of* Gunter's *Quadrant; which in short I shall thus describe.*

First, The outward edge or Arch is divided into 90 parts, called degrees, divided partly as I shewed in the Quadrant in the afore-mentioned *Post-Dial.*

Secondly, Above the 10, 20, 30, *&c.* is set Letters for the Months; begin at the left hand, where is the Letter I. for *January*, next F. for *February*, and so on to *June*; and at *July* goes back again to A. *August*, S. *September*, and so on to *December*; each Month is divided into 30 parts by lines, to represent the days of the Month.

Thirdly, Upon the line G D, (and about the same place of the line) fix two pieces of thin Brass, with a hole in each, called sights, or drive in two little Nails without heads, that one may shade the other, that is, from G towards D, when you hold the Quadrant in the Sun to know the hour of the day.

Lastly, In the Center A, let a thread or Silk be fastened, and a Plummet of Lead at the other end, and put on the Silk a Pin's-head or small Bead.

How to know the Hour of the Day by the Quadrant.

First, Lay the Silk or Thread over the day of the Month, and hold it so till you slip the Pin's-head to rest over one of the 12 a Clock lines: this done,

Let the Sun shine from the sight at G, to the other at D, (the Plummet hanging at liberty) the

Pin's

Pin's-head will reſt againſt the hour of the day.

This, with a little trial in the Sun, you will find eaſie.

Prob. 4. *How to know whether the top of the Poſt on which you intend to fix an Horizontal-Dial be exactly level or no.*

Lay a Ruler on the top of the Poſt, and apply the edge of the Quadrant A D to the under ſide of the Ruler, ſo that the Plummet may hang over the line A B of the Quadrant, and if it fall directly upon the level line A B, making no Angle, it is a true Level, or Horizontal plane.

But to try an upright Wall, to place a *Dial* thereon, hold the edge of the Quadrant A B againſt the Wall, and if the Thread and Plummet fall directly on the level line, at the entrance of the degrees, it is an upright Wall, and neither inclines, nor reclines.

Prob. 5. *How to take the Heighth of a Tree or Steeple by the Quadrant.*

Hold up the Quadrant, and ſpy through the ſights, or along the edge A D, the top of a Steeple, ſtepping backwards or forwards, till the Plummet hangs againſt 45 degrees, (that is, at the middle of the Quadrant) the Plummet hanging at liberty.

Then is the heighth of the Steeple equal to the diſtance of the bottom thereof, your ſtanding, to which add the heighth of your Quadrant from the ground, which diſtance meaſure into Feet or Yards.

But if the Plummet cut one quarter of the Quadrant (or 22*d.* and half) in taking of ſight, then twice the diſtance from your ſtanding, to the bottom

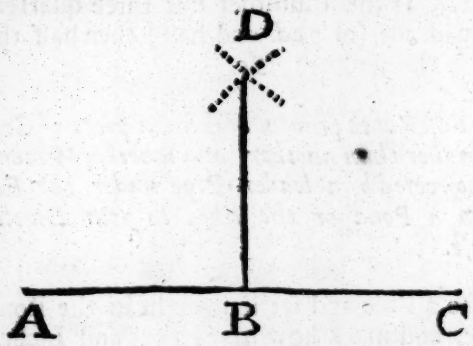
tom of the Steeple or Tree, is the heighth, to which add the heighth of your Quadrant.

Lastly, If the Plummet cut three quarters of the Quadrant, (or 72*d.* and half) then half the distance is the heighth, *&c.*

Prob. 6. *How to prove whether one piece of Ground be higher than another, and whether Water may be conveyed by a leaden Pipe under the Earth, from a Pond or the like, to your Dwelling-house.*

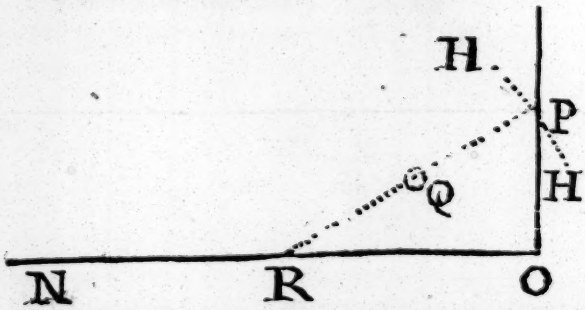
Take a Pole and set it upright in the Pond of Water, and mark how many Feet and Inches remains above Water; then place another Pole of equal length at the place whither you would have the Water conveyed; then place the edge A B of the Quadrant against the Pole, the Center A against the top of the Pole, the Plummet hanging at liberty, and spy through the sights the top of the Pole that is in the Water, and if the Thread cutteth any degrees of the Quadrant, the Water may be conveyed by Pipe or Trench to your desire.

Prob. 7. *How to erect a Perpendicular Line upon a Line given.*



First, The given line A C divide into two equal parts; then extend the Compasses to any convenient distance, from C towards D, and strike an Arch; then, with the same extent, place one foot in A, and with the other cross the former Arch in D. Lastly, from the point D, where the two Arches cross, or intersect each other, draw the perpendicular line to B.

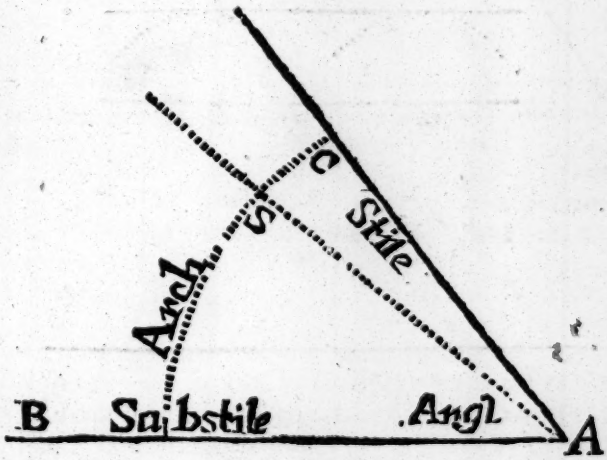
Prob. 8. *To erect a Perpendicular Line upon the end of a Line, by which you may draw a true Square for a Dial,* &c.



Let N O be the line given, open the Compasses to any small distance, and set one foot in the point

point O, pitching down the other foot at adventure, (which in this is at the point Q) the point of the Compasses resting in Q, turn the other about till it cross the given line at the point R, the foot still resting in Q; with the other describe the Arch H H over the point O; then lay the Ruler from K to Q and it will cross the Arch H H in P. Lastly, Draw the line O P, which will be a perpendicular line, to the given line N O.

Prob. 9. *How to lay down upon Paper an Angle containing any number of Degrees or Minutes, or to make the heighth of the Style for an Horizontal-Dial for the Latitude of* Bedford, *that is* 52 d. 14 m.



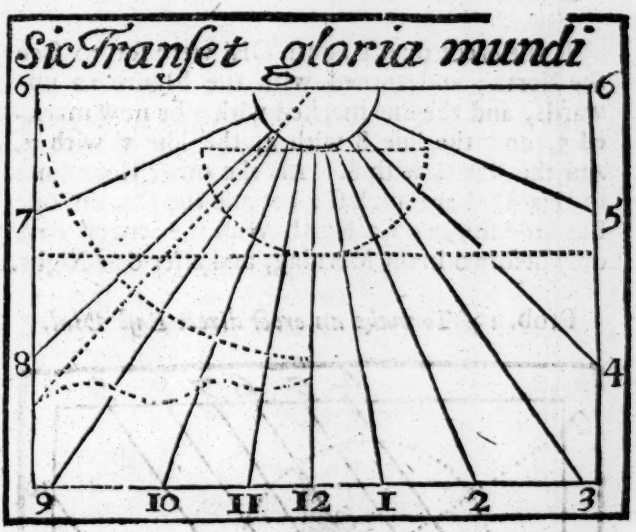
First, Draw a line at pleasure, (as the line A B) which we will suppose to be the line of 12 a Clock on a *Post-Dial*; let it be required to make an Angle of 52 d. 14 m. Extend the Compasses upon the degrees of the Quadrant, from the beginning of the degrees to 60 degrees: with that

extent set one foot upon the point A, and with the other describe the dotted arch line B C. Lastly, take with the Compass 52 d. 14 m. (the Latitude or heighth of the North Pole Star at *Bedford*) and set it off in the arch line from B towards C, and draw the line C A for the heighth of the Cock or Style: But for the Style of a direct South Dial, take all the other part of the Arch of the Quadrant, and set it off in the said arch line from B to S, the heighth of the Style.

Prob. 10. To draw Parallel Line, or Lines at equal distance, is only by drawing Arches with the point of the Compass, as this Figure sheweth, from the given line.

Prob.

Prob. 11. *To make the erect direct South Dial.*



The making of this differs very little from the Horizontal, as you may perceive by the preceding Figure.

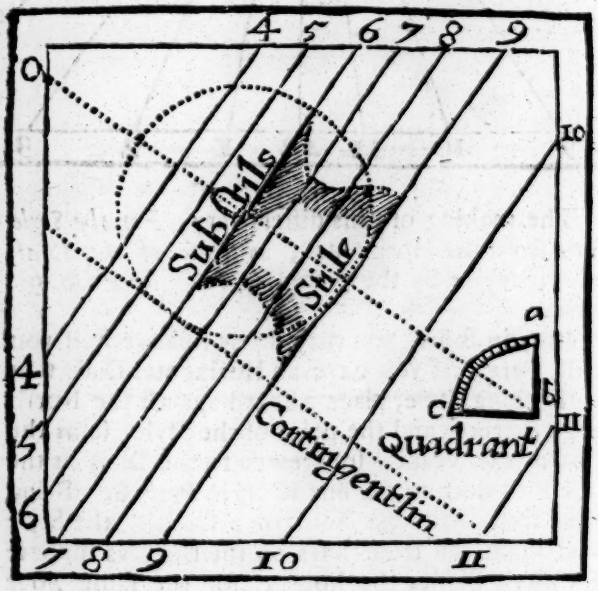
For the Style of this Dial, see Prob. 9.

But, in short, you may do as followeth, if you will, (*viz.*) If you have an Horizontal Dial, that hath a long Style, place a Board against the North edge thereof, and the point of the Style, so as the Board is set exactly squarewise to the Dial, as the line P O doth to the line N O, in *Prob.* 8. Being thus fixt, from the light of a Candle, the Style will shade the Hour-lines on the Dial, as suppose the Style shades the hour 3, for the same hour make a mark on the Board; do so for the rest of the hours, except the 6 a Clock line, which may be done without a Shade: The Style serves for both Dials as it stands, and so I shall leave you to part Style, and proceed to

Prob. 12. *The making of a North erect direct Dial.*

If the erect direct South Dial were set to face the North, and turned with the Figure 12 upwards, and the line marked with 7 be now marked 5, and the line 8 with 4, the line 5 with 7, and the line 4 with 8. All the other Hour-lines in this Dial are useless, because the Sun in our Latitude shines on a North-Wall the longest day, only before 6 in the Morning, and after 6 at Night.

Prob. 13. *To make an erect direct East Dial.*



If you apply a Board to the West-side the Post Dial (as was shewed for the South Dial) you may draw an East Dial thereon, by diligent observation.

But,

But, however, I shall describe the way of making: It is called an East Dial, because it is to face the East point towards Sun-rising.

First, Make a quarter of a Circle, (by *Prob.* 8) as the Quadrant A B C in the Dial, but much larger; divide the Arch A C thereof into 90 degrees (by *Prob.* 3.) let the side A B be upright, and the Arch behold the South; number therein the Elevation of the Pole downwards, from A towards C, (according to the Latitude in which you dwell) as suppose 52 degrees, by the end of that number or degrees, from the Center of the Quadrant at B, draw a line so long as the Plane or Paper (on which you draw it) will give leave, (which in this Dial is the dotted line B O).

Draw a Circle, and in the Center of which draw a line (by *Prob.* 7.) for the 6 a Clock line, squarewise to the line O B:

Then, at the out-side of the said Circle, draw a contingent line, parallel to the line O B, (by *Prob.* 10.)

Then divide the half Circle next the contingent line into 12 equal parts.

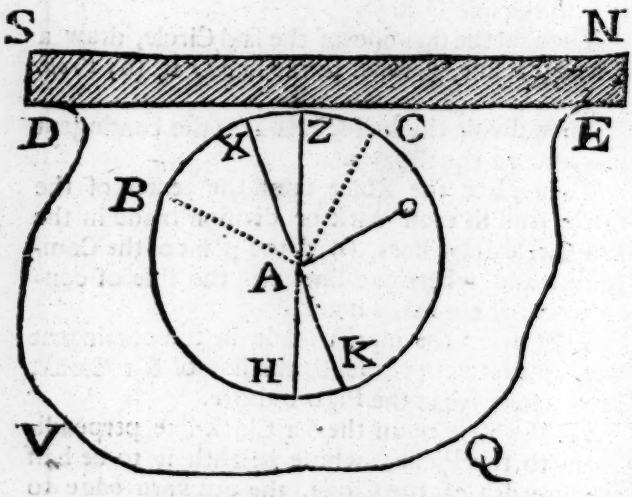
Then place the Ruler upon the center of the Circle, and to each mark or division made in the half Circle draw lines, (with the point of the Compasses) and where the lines cut the line of contingence, there make marks.

Then from the marks made in the contingent line, draw lines parallel to the line of 6 a Clock, as you may see in the Figure above.

Fix the Style upon the 6 a Clock line, perpendicular to the Plane, whose heighth is to be half the breadth of the Circle, the outward edge to be parallel to the Hour-lines, and may be made of thin Brass, Tin, or Wier.

Note, Whereas this *Dial* ſerveth only for the Eaſt, but if you deſire to make a Weſt *Dial,* it is but taking your Weſt *Dial,* already drawn upon Paper, and lay the face thereof to a Glaſs Window, and draw the ſame lines on the back of the Paper, ſo may you have an Eaſt *Dial* on one ſide the Paper, and a Weſt *Dial* on the other ſide, having firſt ſet Figures at the ends of the lines, (that is) inſtead of 11, 10, 9, 8, 7, 6, 5, 4, in the Eaſt *Dial,* you muſt ſet againſt the ſame lines for the Weſt *Dial*, 1, 2, 3, 4, 5, 6, 7, 8, for the Hours. Alſo note, That you are to place no lines in theſe *Dials* beſides the Hour-lines.

Prob. 14. *To find the Declination of a Plane.*



If the Plane, whereon you are to make your *Dial,* behold neither the Eaſt, Weſt, North nor South Points of the World, but decline therefrom, then it will be neceſſary to ſhew how to find the De-

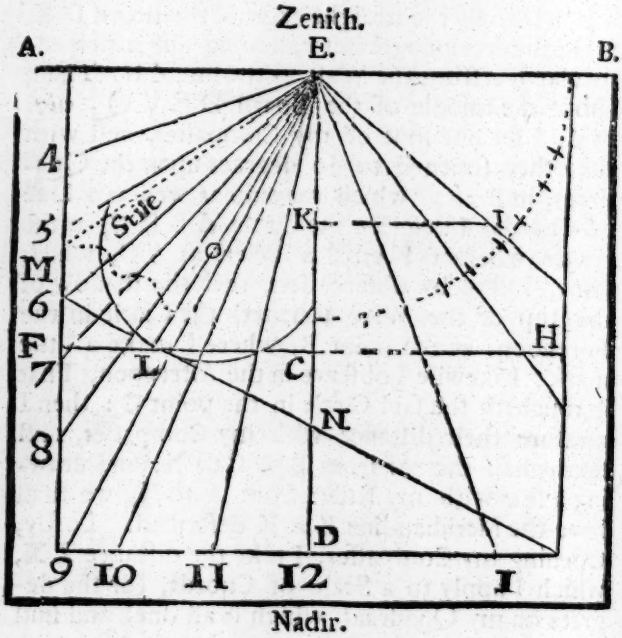
Declination thereof, which may be obtained ſeveral ways, but thus in ſhort:

Example. Let S N D E repreſent the face of the Plane (or Wall) whereon I am to make a *Dial*, to which I apply the ſtraight edge of the Board D E, as in the foregoing Figure, letting fall a perpendicular line from the Wall, as the line Z H. Then, about the middle of the Board D E V Q, *viz.* at A, I ſet one foot of my Compaſſes, and with the other (opened to 60 degrees upon the Quadrant, in *Prob* 3. which may do as well as a Line of Chords) I deſcribe the Circle Z B H C, in the center whereof I erect a Wier, as A O, which done, I find by obſervation, that the ſhadow of the top of the Wier toucheth the Circle in the Forenoon, at the point B, where I make a little mark: Likewiſe I obſerve in the Afternoon, That it toucheth the ſaid Circle in the point C; then I meaſure their diſtance with my Compaſſes, and ſet the half thereof from B or C to X, and drawing a line with my Ruler from A to X, we ſhall have the Meridian-line K A X deſcribed. Laſtly, Opening my Compaſſes, I take the diſtance Z X, which I apply to a Scale of Chords, (or the degrees on my Quadrant, which is all one) and find the Arch thereof, 18 deg. 10 min. And ſo much is the declination of the Plane E D N S, which you may ſee by the Meridian-line K X is towards the Weſt. This then is a South Plane, declining Weſt 18 degrees, 10 minutes.

Note, That the Circles, mentioned in *Problem* 2. will do better for this Work than a ſingle Circle.

Prob.

Prob. 15. *How to make a South erect declining Dial in the Latitude of* 52 d. 14 m. *declination of the Plane, or Wall,* 52 *degrees.*



In all declining *Dials*, because the Style doth not hang directly over the Meridian, or 12 a Clock line, first find out the place of the Substyle, (which is the line E L, over which the Style directly hangeth; see *Prob.* 9.) having by the Board in the last *Prob.* found the declination of the Plane, or Wall, to be 50 d. 0 m. do thus:

First, Draw the Horizontal A B, let the Meridian-line fall perpendicularly, (by *Prob.* 7.) which in this *Dial* is the line E D: Then draw the line F H (by *Prob.* 10.) parallel to the line A B, at what

what diſtance you will. Next, Upon the Center E, deſcribe the Quadrant or quarter of a Circle, from C to A, if the declination of the Plane be Weſtward, or from C towards B if Eaſtward, as in this Example.

Then divide the quarter of a Circle into 90 degrees, (as is ſhewed in *Prob.* 1.) and number in it from C towards B, the complement of the Poles elevation 37 d. 46 m. or remainder of a Quadrant, (the other part is the real elevation) where make a mark, from which mark in the Circle draw a line to the center E, the ſaid line being extended to H in the *Dial* above.

Again, Account in the Quadrant from C towards B, the declination of the Plane or Wall 52 d. and from thence draw the line I E, as in the *Dial.*

Then ſet one foot of the Compaſſes in the point C, and extend the other to H, (that is, the point where the line H E cutteth the line F H) the foot reſting in C; extend the other to the neareſt diſtance of the line E I, where make a mark, and draw the line I K parallel to the line C H.

Next, Take the juſt length of the line I K, and place one foot in C, and turn the other towards F, and make the point L, and draw the line L E for the Subſtyle.

Next draw the line of Contingence ſquare-wiſe to the Subſtyle (by *Prob.* 7.) in the point L, which line of Contingence is the line L N in the *Dial.*

Then take the diſtance between the center E and the point K, and place that extent in the line of contingence, from the point L to M, and draw the line E M for the Style, which in the *Dial* above is a dotted line.

Then take the neareſt diſtance between the point L and the line of the Style, one foot remaining in L, turn the other towards E, and make the cen-

center O in the ſubſtylar line, upon which deſcribe the Equinoctial Circle (or ſo much as may ſerve next the Hour-lines). The placing the Ruler upon O the center of the Equinoctial Circle, and N the point where the Contingent-line cutteth the 12 a Clock line, (being thus laid) make a mark where it cutteth the Circle, for at that mark you are to begin to divide the Circle into 24 equal parts; notwithſtanding thoſe twelve are only in uſe which are next the Contingent-line.

Laſtly, Lay a Ruler upon the center O, and upon the ſeveral marks or diviſions made in the Equator, or half Circle, and where the edge of the Ruler ſhall then touch the line of Contingence, make marks or points therein; from which points made in the Contingent-line, draw Lines to the center of the *Dial* at E, which are for the Hour-lines, the reſt of the lines to be put out.

Place the Meridian-line E D perpendicularly upon the Wall, the center E upward; let the Style (or line M E) hang directly ſquare-wiſe over the Subſtylar-line, (or line L E) making an Angle equal to M E L, as may appear by the *Dial* above.

Note, That whereas this *Dial* is to be ſet againſt a South erect declining Wall or Chimney, if you turn it to the North-ſide the ſame Wall or Chimney, it will ſerve for a North declining *Dial* being turned, that E the center be downwards, and ſome of the Figures for the Hours altered.

North declining Dial.

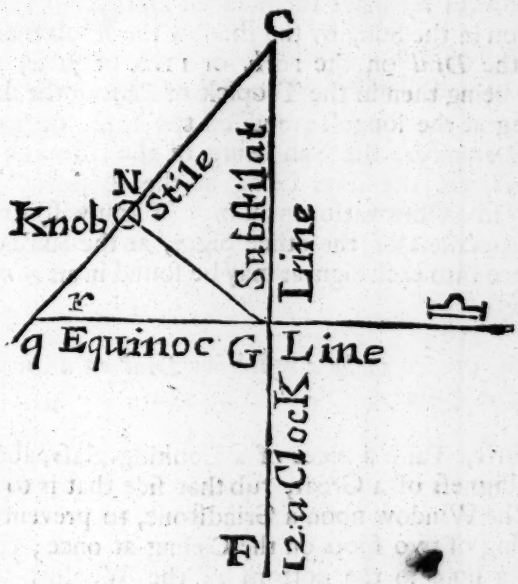
Note further, That if you make a *Dial* that declines as far as 60 deg. or more, firſt draw it on a boarded Floor, or on large Paper, (with long Compaſſes) and cut off ſo much of the *Dial* (when finiſhed) next the center according to the bigneſs you would have your *Dial*.

Like-

Likewise, That if the *Dial* had declined 45 degrees East, and fixed on a Wall, if you make another declining West 45 degrees, and fix the edge thereof to the other, to stand like two sides of a square Vessel, they both will shew the hour of the day as long as a *Post-Dial.*

And if you make a large *Horizontal Dial,* you may divide the hours into minutes, for after you have divided each hour into quarters, divide each quarter into 15 parts, one part white, and another black, *&c.*

Prob. 16. *How to draw the Equinoctial-line upon a South, or any other Dial that hath a Center.*



First, Fix a *Nodus,* or knob of Iron upon the edge of the Style, to shade the Equinoctial-line, which will be when the Sun is in *Aries* and *Libra,* that

that is on the 10*th.* or 11*th.* of *March*, and 12*th.* or 13*th.* day of *September* the days and nights being then equal.

Secondly, Draw upon Paper the form of the Substyle, Style and Knob of your *Dial*, as the lines C F and C q, as in the Figure aforegoing.

Then from the knob, or point N, in the Style, let fall a perpendicular, (by *Prob.* 7.) and where it cutteth the Substylar-line at the point G, there draw the Equinoctial-line square-wise to the Substylar-line, at one end set ♈, and the other ♎.

Lastly, It is somewhat harder to draw the two Tropicks by Rule, therefore I shall not trouble the young Learner therewith, because he may (if he desires it) place them in all *Dials*, by observation in the Sun, by the shadow the Knob makes on the *Dial* on the 10*th.* or 11*th.* of *June*, the Sun being then in the Tropick of *Cancer*, the days being at the longest; and on the 10*th.* or 11*th.* of *December*, the Sun being in the Tropick of *Capricorn*, the days being at the shortest. By the same Observations you may (if you will) draw the parallels of the other Signs, at the Sun's entrance into each Sign, as may be found in an *Almanack*.

Prob. 17. *To make a reflecting Dial on a Cieling of a Room.*

First, Take a piece of a Looking-glass, about the bigness of a Groat, rub that side that is to lie on the Window upon a Grindstone, to prevent its casting of two spots on the Cieling at once; then cut a hole in the bottom of the Window near the Glass, (where the Sun shines most) and let in the Glass even with the top of the Wood, and fasten it in with the same Paint that is directed for the back of your Dial-boards following, (used warm)

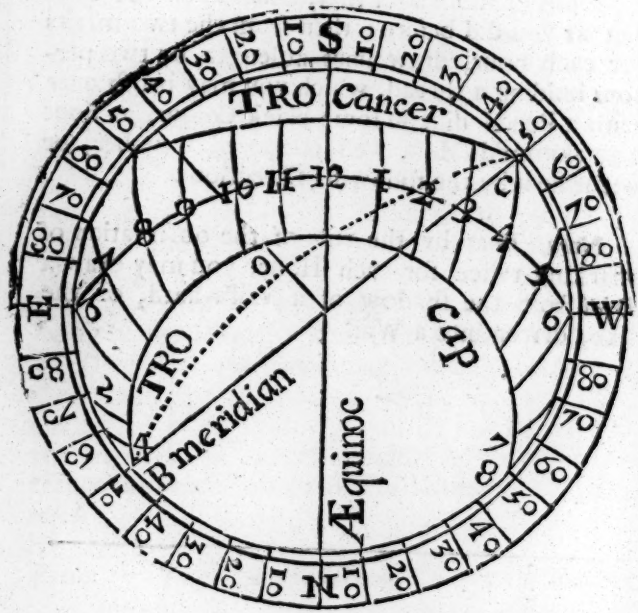
warm) and that the Glaſs may remain ſo fix'd, nail a piece of ſtrong Tin over it (the Tin having a hole in the middle thereof.)

The Glaſs being fixed, mark upon the Cieling at every hour where the ſpot of the Sun from the Glaſs ſhineth (by another Sun-dial in the Sun); if you have ſet a mark for each hour that day, about a Month or more after that, mark upon the Cieling as you did before; then from the two marks for each hour, draw lines at length, by two perſons holding a thread, which you may bruſh over with a Pencil dipt in ſome black Colour, as Soot and skimm'd Milk, well tempered together, or beautifie it by the following Directions.

Note, That by the rule of the obſervation of marking twice for each Hour, you may draw a *Dial* from the ſhadow of a Nail's-head, or the like, driven into a Wall.

This Instrument of the Horizontal Projection will shew if you describe no more Hour-lines than shall at some times in the Year serve for Use upon your Dial.

For Example.



Suppose a Southern Plane declining Eastward 40 degrees 30 minutes, and inclining 24 degrees. Or, a Northern Plane declining Westward 42 degrees 30 minutes, and reclining 24 degrees. Set the Radius to 42 degrees 30 minutes on the South-East side, and note on it the Obliquit with the Letter O; then through these three points given B O C, imagine a blind Arch to be traced, this Arch on the Convex or out-side that is in the South Inclining *Dial* shall shew from Sun-rising to one a Clock

Clock in the Afternoon: And on the Concave, or in-ſide, that is in the North Reclining *Dial*, ſhall ſhew from Two a Clock in the Afternoon till Sun-ſetting. Note, That the movable Diameter re-preſents an upright Wall or Plane, having that Declination 42 d. 30 m.

Herein is inſcribed only the Meridian, Equinoctial, two Tropics, and the Arches of the Horary Circles, between the Tropics, and having affixed to the Center a movable Diameter B A C, with the perpendicular Radius A, 90 degrees.

Of fitting up and painting Dials.

Make your Dial-Plane of the firmeſt and cleareſt Oak; let it be throughly dry, leſt it ſhrink. Cut your Boards to ſuch a length as you deſign the Dial to be of, and as many of them as make up your intended breadth, plain them on both ſides, (for they will ſhrink after plaining, tho' they were dry before;) when they are dry enough, ſhoot them again with good joynts, and faſten them together in the Glewing with wooden Pegs, as Coopers do the bottoms of their Tubs; being thus glewed and dried, plain them again, and fit the edge into a Moulding, put round it like a Pannel of Wainſcot in its frame.

To Prime the Dial-Plane.

Take *Spaniſh* Brown well ground with Linſeed-Oil ſomewhat thin, that the Oil may pierce into the Wood, and with a large Briſtle-bruſh colour the Plane all over on every ſide; when it is dry, do it over again with more of the ſame Colour ſomewhat thicker; which when dry alſo, do it over again the third time, ſo will your Work be more durable; when this is dry, colour it

with white Lead and Linseed-Oil three or four times.

To transfer the Draught of the Dial upon the Plane.

Having the Figure of the Dial upon a Sheet of Paper, nail it, or stick it on the Dial-Plane with Mouth-Glew ; then lay a Ruler upon the Center of the Dial, and upon the Hour-lines, whereby you may extend the Hour-lines to what length you please, with a black Lead Pencil: this done, take the draught off, and having ground Vermilion with fat Oil, as stiff and thick as you can use it, draw the Hour-lines therewith.

How to make the thick or fat Oil.

Boil Linseed-Oil with a good quantity of red Lead, till it is thick as Treakle, or Syrup ; then, with a lighted Paper, set it on fire, to take away its greasiness ; let it burn a minute or two, and extinguish it by laying a Cloth close over it; let it cool and settle, and pour off the clearest to be kept in a Bladder for use.

To make Gold Size.

Take yellow Oker, ground very fine with Water, and, when it is dry, mix it with the aforesaid prepared Oil, and grind them together very fine. Where note, You ought to mix it to that fit body, that, after it is laid on, it may settle it self smooth, but not so thin as to run.

To Gild the Letters or Figures of Sun-Dials.

Draw the Figures with the Gold Size, which let dry, till by touching of it with your finger, it will ſtick a little, but not come off; then, with a ſmooth-edged Knife, cut Leaf-Gold into ſuch pieces as may beſt fit your Work; then with a flat Stick, lin'd with Cloth, take up the pieces of Gold and lay it upon the Size, and preſs it down with Cotton, and when it is through dry, with a Feather bruſh off the looſe Gold.

How to make the Margin of the Dial blue.

After the Figures or Letters for the Hours are gilt and dry, take white Lead, ſtiffly tempered with the aforeſaid fat Oil, and therewith cover over the whole Margin; then with a fine Searſe ſift on fine Powder of Smalt, and with a piece of Cotton dab it down cloſe; when it's throughly dry, blow off the remainder with a pair of Bellows.

Note, That the Colour mentioned to paint the Border-boards in Gardens, (if you prepare it right) is alſo good to preſerve any thing long in wet or moiſt places, as wooden Troughs, Barrels, Tubs, the Pillars of Sun-dials, wooden Pails or Arbours; and ſpread on Paper, will ſtop cracks in Bottles; or on Cloth, to cover Tents to keep out Rain.

A Table shewing the Distance of the Hour-lines, from the Miridian, for an Horizontal Dial in these Degrees of Latitude.

Lat.	50		51		52		53		54		55		56		Lat.
Ho.	D	M	D	M	D	M	D	M	D	M	D	M	D	M	Ho.
1	11	36	11	45	11	55	12	5	12	13	12	32	12	39	11
2	23	51	24	9	24	26	24	44	24	59	25	18	25	33	10
3	37	27	37	50	38	13	38	36	39	3	39	18	39	38	9
4	52	58	53	22	53	44	54	7	54	26	54	47	55	6	8
5	70	41	70	56	71	9	71	25	71	37	71	51	71	2	7

Ho.	For a South-Dial.														Ho.
1	9	47	9	34	9	22	9	9	8	57	8	44	8	31	11
2	20	21	19	56	19	33	19	8	18	44	18	18	17	52	10
3	32	44	32	8	31	36	31	1	30	27	29	49	29	11	9
4	48	4	47	24	46	48	46	10	45	29	44	48	44	3	8
5	67	20	66	52	66	26	65	56	65	27	64	53	64	20	7

To draw an Horizontal Dial by the first Table.

FIrst, Take with your Compasses from a Line of Chords, or from the Edge of the Quadrant 60 Degrees, with that Distance describe a Circle; cross that Circle through the Center with a Diameter for a Miridian-Line (as the Line *e c* in the Horizontal Dial before) and cross that Diameter at Right Angles for the 6 a Clock line (as the Line A B in the said Horizontal Dial) Then consider for what Latitude you draw the Dial, which in this is 52 Degrees.

Look 52 on the Top of the Table (against which is set Lat. for Latitude, under which you will find 11*d.* 55*m.* for the Distance of 11 and 1 a Clock, which Distance take off the Edge of the Quadrant with the Compasses, and set it off from the Meridian-Line *e c* in the Arch towards A (as in the said Horizontal Dial is a dotted Line,) And for the Distance of 2 and 10 a Clock is 24*d.* 26*m.* from the said Meridian-Line, and so of the Rest.

And after your come to the Hour of 6. you may draw the remaining Hours, by laying a Ruler through the Center to their opposite Hours.

By the lower Table, you may draw an erect direct South-Dial, observing the foregoing Figure of a South-Dial.

Note, That the Style, Cock, or Gnomon must be 52 degrees high, or according to the Latitude, or heighth of the Pole, you make it for.

But the Style's heighth of the South-Dial, must be the other part of the Quadrant of 90 degrees, which according to this Example is 38 degrees.

And

And being I write this for those that have no skill in Arithmetick, I shall shew, how to know the North-pole Star (*viz.*) In a Star-light Night look Northwards for 6 or 7 Stars called *Charles-wain*, which somewhat resembleth the Figure thereof following; the two Stars noted CD are placed almost in a right Line with the North-star, which said 6 or 7 Stars move equally about the Pole-star in 24 Hours.

A TA-

A TABLE *to measure Round Timber.*

Co.	Length.			Co.	Length.		
Inches.	F.	in.	P. 10.	Inches.	F.	in.	P. 10.
10	18	11	2	33	1	7	9
11	14	11	5	34	1	6	8
12	12	6	8	35	1	5	7
13	10	8	5	36	1	4	7
14	9	3	7	37	1	3	8
15	7	10	3	38	1	3	0
16	7	0	8	39	1	2	3
17	6	3	0	40	1	1	6
18	5	7	0	41	1	0	9
19	5	0	2	42	1	0	3
20	4	6	3	43	0	11	7
21	4	1	2	44	0	11	1
22	3	8	9	45	0	10	7
23	3	4	9	46	0	10	2
24	3	1	7	47	0	9	9
25	2	10	7	48	0	9	4
26	2	8	1	49	0	9	0
27	2	5	8	50	0	8	7
28	2	3	7	51	0	8	3
29	2	1	8	52	0	8	0
30	2	0	1	53	0	7	8
31	1	10	6	54	0	7	4
32	1	9	2	55	0	7	2

Of

Of measuring Round Timber.

Co.	Length.			Co.	Length.		
Inches.	F.	in.	P. 10	Inches.	F.	in.	P. 10
56	0	6	9	79	0	3	5
57	0	6	7	80	0	3	4
58	0	6	4	81	0	3	3
59	0	6	2	82	0	3	2
60	0	6	0	83	0	3	2
61	0	5	8	84	0	3	1
62	0	5	6	85	0	3	0
63	0	5	5	86	0	2	9
64	0	5	2	87	0	2	9
65	0	5	1	88	0	2	8
66	0	4	9	89	0	2	7
67	0	4	8	90	0	2	7
68	0	4	7	91	0	2	6
69	0	4	6	92	0	2	6
70	0	4	4	93	0	2	5
71	0	4	3	94	0	2	5
72	0	4	2	95	0	2	4
73	0	4	1	96	0	2	4
74	0	3	9	97	0	2	3
75	0	3	8	98	0	2	3
76	0	3	7	99	0	2	2
77	0	3	7	100	0	2	2
78	0	3	6				

Of

Of measuring Board or Glass.

Bread.		Length.		
Fe.	In.	F.	in.	pts.
0	1	12	0	0
0	2	6	0	0
0	3	4	0	0
0	4	3	0	0
0	5	2	5	8
0	6	2	0	0
0	7	1	8	6
0	8	1	6	0
0	9	1	4	0
0	10	1	2	4
0	11	1	1	1
1	0	1	0	0
1	1	0	11	8
1	2	0	10	3
1	3	0	9	6
1	4	0	9	0
1	5	0	8	5
1	6	0	8	0

Bread.		Length.		
Fe.	In.	F.	in.	prts.
1	7	0	7	6
1	8	0	7	2
1	9	0	6	8
1	10	0	6	5
1	11	0	6	2
2	0	0	6	0
2	1	0	5	8
2	2	0	5	5
2	3	0	5	3
2	4	0	5	1
2	5	0	5	0
2	6	0	4	8
2	7	0	4	7
2	8	0	4	5
2	9	0	4	4
2	10	0	4	2
2	11	0	4	1
3	0	0	4	0

Of measuring Square Timber.

Fe.	In.	F.	In.	prts	Fe.	In.	F.	In.	prts
0	6	4	0	0	1	9	0	3	9
0	7	2	11	2	1	10	0	3	5
0	8	2	3	0	1	11	0	3	3
0	9	1	9	3	2	0	0	3	0
0	10	1	3	3	2	1	0	2	8
0	11	1	2	3	2	2	0	2	6
					2	3	0	2	3
1	0	1	0	0	2	4	0	2	2
1	1	0	10	2	2	5	0	2	1
1	2	0	8	8	2	6	0	1	9
1	3	0	7	6	2	7	0	1	8
1	4	0	6	7	2	8	0	1	7
1	5	0	5	9	2	9	0	1	6
1	6	0	5	3	2	10	0	1	5
1	7	0	4	8	2	11	0	1	4
1	8	0	4	3	3	0	0	1	3

Of measuring Brick Walls.

Feet.	Fe.	In.	Feet.	Fe.	In.
1	272	3	16	17	0
2	136	1	17	16	0
3	90	9	18	15	2
4	68	0	19	14	4
5	54	5	20	13	8
6	45	4	21	13	0
7	38	1	22	12	4
8	34	0	23	11	10
9	30	3	24	11	5
10	27	2	25	10	11
11	24	4	26	10	6
12	22	8	27	10	1
13	20	11	28	9	9
14	19	5	29	9	5
15	18	2	30	9	1

The Use of the Table of Round Timber.

Suppose a Round Timber-stick, or Garden-Stone-Roller, be 48 Inches about (girt taken with a string) how much in length thereof will make a solid Foot.

Look in the Column, over which is set Co. (for compass) for 48 Inches, against which stands 0, 9, 4, that is, no Feet, 9 Inches, and 4 tenth part of an Inch; And so much in the length of the Timber makes a Foot solid.

The

The Use of the Table to measure Board or Glass.

Suppose that a Board or Pane of Glass be 7 Inches broad; how much in the Length thereof will make a Foot.

Look in the Table for 7 Inches in the first Column, and right against it in the second Column you may find, 1 Foot 8 Inches, and 6 tenth parts of an Inch in the Length thereof to make a Foot.

The Use of the Table to measure square Timber or Stone.

If the side of the Square, at the End of a squared Piece of Timber be 2 Foot, 2 Inches; how much of that Timber or Stone in Length will make a Foot solid.

Look 2 Foot, 2 Inches in the first Column of the Table, and right against it in the second Column, you may find, 0, 2, 6. which is no Feet, 2 Inches, and 6 tenth parts of an Inch in length to make a Foot.

To find the true Square, extend the Compasses on Gunters-line, from the Breadth to the Thickness in Inches, the Midway of that Extent is the Square.

The Use of the Table to measure Brick Walls.

Suppose a Wall be 22 Foot high, how much in length thereof will make a Rod or Pole-square; Find 22 the heighth in the first Column, and right against it in the second Column, you may find, that 12 Foot and 4 Inches thereof in length, will make a Rod of 16 Foot square.

A general Epistle for young Scholars, and little Children.

Dear Children,

MY end in Writing is to encourage you to continue in love with Vertue, (and haters of Vice) the Path of the just, the way to Eternal happiness, that you may spend your time which is precious (in the fear of God) and in the afore-mentioned harmless and usefull Studies, and other serviceable Labour (as you grow in years) but not in *Astrology*, and foolish Sports and Plays, but as *R. R.* advises the young Learner in these Verses.

O Child which comes to learn,
And desires to be taught,
Serve thou the True and Living God
In Deed, in Word and Thought,
And do not love to spend thy time,
Despising Virtues ways,
In fading joys, in foolish toys,
In idle sports and Plays.

2. Do not corrupt the knowledge which God has given you, (by learning at Latin Schools) lascivious Books, and Stage-play Books, too much in use in these days, that the Authour writeth to the young Scholar thus,

So

So do not imitate the vain,
Grammarian's heathenish strain,
And Authours which the multitude
Applauds, that are prophane.
Remove from thee God Mars'*s Justs,*
And Goddess Venus *Jests,*
Which Virgil'*s Page, and* Terence *Stage,*
Thee to embrace request.
Count it a Crime, the bawdy Rhime
Of Ovid *to rehearse,*
To a modest face, the great disgrace,
Of all the Latin Verse.
Which when that one hath learned,
He hath but fancies seen,
And in the utter darkness,
To live hath striving been.
Avoid the Cause in any clause,
That may corrupt thy Wit,
Simplicity is for innocents,
Read thou the Holy Writ.

3. Also in the said Latin Schools are taught Youth, Books concerning strange Fancies of the heathen Gods,——saying, *Holy Jupiter*, and father of their Gods, who were his Bastards by ravish'd Wives, some of them their mother *Mnemosyne* (that signifies *Memory*, say they) and were accounted the Inventers and Teachers of Arts, and Inspirers of their Poets with Verses and Songs ——whom they usually invocate for that purpose. ——Ascribing their Ability and Sufficiency to them.——Oh! what a shame is it for the professors of Christianity, to teach Youth such heathenish Fancies, whereby many good Wits are corrupted, and begot into sensual Wisdom and Atheism, that caused my Authour to write to the Teachers of these things thus,

Grammarians, these Examples first explain,
Then may appear whether your Books be vain,
What are the Muses, that begins your Song
The faith of Gods and Men, that's cast among
With other Oaths, Baal's *Temple,* Pol, Jove's *son*
Herc'les *how bred, and how these Oaths begun.*
How he begat God Bacchus, *and* Apollo,
How jealous Juno, *did their Mothers follow.*
Leave not, how Venus *sprung o'th' Sea, nor yet*
How she with Mars, *lay nak'd in* Vulcan's *net.*

4. That such heathenish Learning may be banished out of a Nation professing Christianity, (the said Authour adviseth) that a Form of sound, or wholsome Words (Holy Scriptures in the Latin Tongue, be taught such as are to learn Latin) which *Timothy* knew from a Child, and it was his commendation, not that he knew prophane and old Wives fables, which he was to avoid. To which he adds,

More of the said Heathenish Fancies and imaginary Gods, you may read in Philips *his new world of* English words, *&c.*

Good manners ill Communication taints,
A form of wholsome words becometh Saints.
Old Wives prophane and foolish Fables shun
Even from a Child the holy Scriptures con.

For the Scriptures are translated by the Eloquentest men of these times, which exceeds the Ancients, even by the Testimony of Grammar it self, which saith, That *Erasmus* (which is one that translated) did best discern of the Latin Tongue: therefore it exceeds the finest Flowers in their Muses Gardens (so called.)

5. See-

5. Seeing therefore, that the Scriptures are able to make wise unto Salvation, through faith in Christ Jesus (therefore, O ye children) be much in Reading and Learning them, and also all the Books of the sufferings of the Righteous in all ages (saith *W. Catton*) that you may remember, how that many of our Ancestors have suffered and sustained a great fight of Affliction (for Righteousness sake) and that the same you may communicate to your Children, that they also may hear of them, and learn them; for *Irenæus* in his Epistle to *Florinus* (saith) *I remember better the things of old, than the affairs of late, for the things we learn in our Childhood, sink further into our minds, and grow together with us*, Eus. Book 5. Ch. 8. The Sufferings of the Righteous in this Age, are yet fresh in the remembrance of many, and may yet be brought up fresher in the remembrance of many, through the present lingering Martyrdom, which may become more sharp and bloody (if God prevents it not) wherefore, *Record, record, as with a pen of Iron, and as with the point of a Diamond*, the notable Observations and Transactions of this Age, which your Eyes, (O ye little Children) shall see and behold, let it be told to your Childrens Children. Therefore murmur not against the Lord, nor entertain any revengeful Spirit in your hearts.

6. If you read or hear any Accusation against any person or people whatsoever, be not hasty in judging, untill you have heard or read the Answer of the Accused, and then be still in your minds, and let God's Grace, the true Witness in your hearts (which will not consent to a Lye) be the Judge in all things, do so before you begin any new work, or make any promise, so will God be your Guide.

7. Dear

7. Dear Children, my Soul even longs for you that you may ſtill remain in your firſt Innocence; for none are the Children of wrath, but they who actually joyn themſelves to the power of the Prince of the Air, by partaking of the forbidden fruit of the Evil of the World, *Eph.* 2. 2. That you may *Remember your Creator now in the days of your youth.* For the ſooner you embrace Truth in a righteous Converſation, the more natural it will become unto you, and the ſooner that you forſake the Devil, and all his Works together with the World, and the Pomp and Vanity thereof, the eaſier it will be for you, and the more bleſſed, and the more happy will you become, ſo that when you come to die, it may be the bleſſed death of the righteous, which many ſo deſire to die, that love not to live the life of the Righteous.

For if you are once grown old in the cuſtom of evil, in the vanities that are in the World, you will find it hard returning into Innocence again, into a righteous and harmleſs Converſation. Yet let not the greateſt of ſinners deſpair, for as ſoon as their hearts are inclined to obey the Reproofs of God's Grace, God is merciful. Therefore, O ye dear Children, provoke not ſuch a loving and merciful God, that gives you Life, Breath, and Being, and provides all neceſſary things for you, apply your whole hearts to the obedience of his grace therein, (that you may be his Children, that you may truly pray, *Our Father which art in Heaven.*——) This Grace or Witneſs for Righteouſneſs troubles you, after you have been wild or wanton, or told a lye, or taken God's Name in vain (though no man doth condemn you) obey its reproofs, and you will receive God's Bleſſing, and your Parents Love, O prize this Grace, Light or Spirit of God, above Gold, and all other

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the Delights of this World (for none want Grace to resist Evil, that obey its Reproofs) the more you obey it, the easier you may overcome Evil and Temptations at their first arising, and as a Pillar of Fire, or Light from the Son of Righteousness, will lead you the way, and give you a greater Knowledge of Christ Jesus, who will be your Saviour indeed (from Sin, *Mat.* 1. 21.) keeping faithful to the one Talent of Grace, your Lamps will be always burning, so ye are ready to enter into the Kingdom of Heaven, whensoever the Bridegroom doth call you out of the Body to Life everlasting.

To be a Door-keeper or Watcher unto the Grace of God in your own hearts one day, *Psal.* 84. 10. is better than a thousand in the vain pleasures of the World, (whose joy is but as a spark) and your Father which is in Heaven, will give you your daily Bread, to nourish your Souls unto Eternal life, that you may dwell with him for ever and evermore.

Kings must take Counsel at the Grace of God in their own hearts (*the Gate of Wisdom*, *Prov.* 8. 34.) yea and lay down their Crowns before it (in which is the Feet of Jesus) if they rule for God, Kings will be nursing Fathers to the faithful thereunto, *Isa.* 49. 22, 23. Hasten this good day more and more, O Lord our God, (which is already dawned) prayeth the Righteous, for thy Names sake, that all people may give unto thee all glory for ever, *Amen.*

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